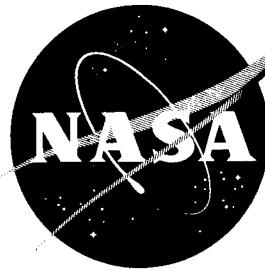
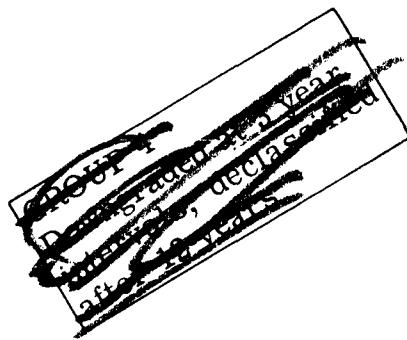


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WIND-TUNNEL INVESTIGATION AT TRANSONIC SPEEDS OF
THE STATIC AERODYNAMIC CHARACTERISTICS AND
PRESSURE DISTRIBUTIONS OF A THREE-STAGE
SATURN LAUNCH VEHICLE

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TECHNICAL MEMORANDUM X-738

WIND-TUNNEL INVESTIGATION AT TRANSONIC SPEEDS OF
THE STATIC AERODYNAMIC CHARACTERISTICS AND
PRESSURE DISTRIBUTIONS OF A THREE-STAGE
SATURN LAUNCH VEHICLE*

By Albin O. Pearson

SUMMARY

An investigation has been conducted in the Langley 8-foot transonic pressure tunnel to determine the static aerodynamic characteristics and pressure distributions of a model of a three-stage Saturn launch vehicle and of one of the first-stage tanks while in place on the model. Tests were performed with and without seal strips between the first-stage clustered tanks. The model force and moment data were determined at Mach numbers from 0.50 to 1.20 at angles of attack from -4° to 10° whereas the model and model-tank pressure distribution and the model-tank force and moment data were obtained at Mach numbers of 1.20 and 1.30 at angles of attack from -8° to 8° and angles of roll from 0° to 90° . Additional pressure-distribution data for the model and model tank were determined at Mach numbers from 0.80 to 1.15 at angles of attack and roll of 0° .

The results of this investigation have shown that the variations of model pitching-moment and normal-force coefficients with angle of attack are essentially linear for all Mach numbers tested and are unaffected by the addition of seal strips between the tanks. A comparison of the center-of-pressure locations with estimated center-of-gravity locations indicates the model is unstable at all Mach numbers tested. The seal strips have a considerable effect on the force and moment characteristics of the model tank.

INTRODUCTION

A wind-tunnel test program has been initiated by the National Aeronautics and Space Administration to investigate the static aerodynamic characteristics of several Saturn launch vehicles. As a part of this program, tests were made at subsonic, transonic, and supersonic speeds of a two-stage version of the launch vehicle, and the results are reported in references 1 and 2.

*Title, Unclassified.

The present investigation provides information on the pitching-moment and normal-force characteristics and also on the pressure distributions of a model of a three-stage version of the launch vehicle with and without seal strips between the first-stage clustered tanks. In addition, force and moment measurements and pressure distributions on one of the first-stage fuel tanks were determined with the tank in place on the model. The model force and moment data were determined at Mach numbers from 0.50 to 1.20 at angles of attack from -4° to 10° . The model and model-tank pressure distributions as well as the model-tank force and moment characteristics were determined at Mach numbers of 1.20 and 1.30 at angles of attack from -8° to 8° and angles of roll from 0° to 90° . Additional pressure distributions were obtained for both the model and model tank with seal strips on at Mach numbers from 0.80 to 1.15 at angles of attack and roll of 0° . The Reynolds number, based on a diameter of 4.130 inches and free-stream conditions, varied from 0.95×10^6 to 1.45×10^6 .

SYMBOLS

The force data presented herein are referred to the body-axis system with the origin for the model data located 1.253 inches from the model base and for the tank data located at the tank base (2.723 inches from model base). The positive directions of forces, moments, and displacements are shown in figure 1. As the model was rotated, however, the tank axes were also considered to rotate about the model center line; hence, positive normal force is always in a direction outward from the model and is in a plane containing the model and model-tank center lines. The coefficients and symbols are defined as follows:

A cross-sectional area of circle which would enclose lox and fuel tanks, 0.09303 sq ft; or cross-sectional area of tank, 0.00690 sq ft

C_m pitching-moment coefficient, $\frac{\text{Pitching moment}}{qAD_{\text{ref}}}$ or

$$\frac{4l^2}{\pi D_{\text{ref}}^2} \int_0^1 c_n \frac{D}{D_{\text{ref}}} \frac{x_{\text{ref}} - x}{l} d\left(\frac{x}{l}\right)$$

C_{m_α} slope of pitching-moment-coefficient curve at $\alpha = 0^\circ$, $\frac{\partial C_m}{\partial \alpha}$, per deg

C_n yawing-moment coefficient, $\frac{\text{Yawing moment}}{qAD_{\text{ref}}}$ or

$$\frac{4l^2}{\pi D_{\text{ref}}^2} \int_0^1 c_y \frac{D}{D_{\text{ref}}} \frac{x_{\text{ref}} - x}{l} d\left(\frac{x}{l}\right)$$

c_N normal-force coefficient, $\frac{\text{Normal force}}{qA}$ or

$$\frac{4l}{\pi D_{\text{ref}}} \int_0^1 c_n \frac{D}{D_{\text{ref}}} d\left(\frac{x}{l}\right)$$

c_n section normal-force coefficient, $\int_0^1 (c_{p,L} - c_{p,U}) d\left(\frac{y}{r}\right)$ for model or $\frac{1}{2} \int_{-1}^1 (c_{p,L} - c_{p,U}) d\left(\frac{y}{r}\right)$ for model tank

c_{N_α} slope of normal-force-coefficient curve at $\alpha = 0^\circ$, $\frac{\partial c_N}{\partial \alpha}$, per deg

c_p pressure coefficient, $\frac{\text{Orifice pressure} - \text{Free-stream static pressure}}{q}$

c_Y side-force coefficient, $\frac{\text{Side force}}{qA}$ or $\frac{4l}{\pi D} \int_0^1 c_y \frac{D}{D_{\text{ref}}} d\left(\frac{x}{l}\right)$

c_y section side-force coefficient, $\frac{1}{2} \int_{-1}^1 (c_{p,r} - c_{p,l}) d\left(\frac{z}{r}\right)$

D body diameter, in.

D_{ref} diameter of circle which would enclose lox and fuel tanks, 4.130 in., or diameter of tank, 1.125 in.

l overall length, in.

M free-stream Mach number

q free-stream dynamic pressure, lb/sq ft

R Reynolds number, based on free-stream conditions and $D_{\text{ref}} = 4.130$ in.

r radius, in.

x_{cg} location of center of gravity forward of model reference center, in.

x_{cp} location of center of pressure forward of model reference center or forward of tank base, in.

| | |
|-----------|---|
| x_{ref} | longitudinal distance along model center line measured from nose cone apex to model reference center, in.; or longitudinal distance along tank center line measured from upstream end of tank to tank reference center, in. |
| x | longitudinal distance along model center line measured from nose cone apex, in.; or longitudinal distance along tank center line measured from upstream end of tank, in. |
| y | lateral distance measured from model center line, in.; or distance measured from tank center line perpendicular to z , in. |
| z | vertical distance measured from model center line, in.; or distance measured from tank center line in a plane containing model and tank center lines and perpendicular to tank center line, in. |
| α | angle of attack of model center line, deg |
| θ | angular location of orifices on tank, measured clockwise from the vertical as viewed from rear, deg (see table II) |
| ϕ | angle of roll of model, measured clockwise from the vertical as viewed from rear, deg |

Subscripts:

| | |
|---|--|
| L | lower (for tanks, portion nearest model center line) |
| U | upper (for tanks, portion furthest from model center line) |
| t | tank |
| l | left (in direction of negative y) |
| r | right (in direction of positive y) |

MODELS, TESTS, AND ACCURACY

Models

Details of the 0.01607-scale model tested are shown in figure 2 and a photograph is presented in figure 3. Two models, both made of steel, were used. One model was mounted on an internally located two-component strain-gage balance and was used to determine the normal-force and pitching-moment characteristics of the overall configuration. The second model was used to determine the pressure distributions and tank loads. The model was instrumented with forty-six 0.033-inch-diameter orifices located longitudinally along the model lower surface (model at $\phi = 0^\circ$). The rearward five orifices, located on the maximum flare near the model base, were located 22.5° from the lower surface. (See fig. 2.) The lower tank ($\phi = 0^\circ$) was instrumented with sixteen 0.033-inch-diameter orifices located around

it at each of six axial stations. The axial and circumferential locations of all orifices are given in tables I and II. The upper tank of the pressure model (model at $\phi = 0^\circ$) was mounted on a four-component strain-gage balance with electrical contacts installed to determine fouling of the tank. For some of the tests brass seal strips were used to close the gaps between the tanks as shown in figure 2. These strips extended from the upstream end of the fuel tanks to a location about $3/4$ of an inch from the fairings at the tank base.

Tests

The tests were conducted in the Langley 8-foot transonic pressure tunnel at a dewpoint such that the airflow was free of condensation shocks. The stagnation temperature was maintained at about $121^\circ F$ and the stagnation pressure at approximately 1 atmosphere. The variation of Reynolds number, based on a model diameter of 4.130 inches and free-stream conditions, with Mach number is shown in figure 4.

The model normal-force and pitching-moment characteristics were determined at Mach numbers from about 0.50 to 1.20 at angles of attack from approximately -4° to 10° . The model and tank pressure distributions as well as the tank force and moment characteristics were measured at Mach numbers of 1.20 and 1.30 at angles of attack of $\pm 8^\circ$, $\pm 4^\circ$, and 0° . For these latter tests the model was rolled through an angular range of 90° in increments of 22.5° . In addition, a survey was made to determine the pressure distribution at Mach numbers from 0.80 to 1.15 with the model at 0° angle of attack and 0° angle of roll.

Accuracy

Based upon balance accuracy it is estimated that the coefficients of model normal force and pitching moment are accurate within ± 0.017 and ± 0.033 , respectively. For the tank, the coefficients $C_{N,t}$, $C_{m,t}$, $C_{Y,t}$, and $C_{n,t}$ as determined from balance measurements are accurate within ± 0.005 , ± 0.009 , ± 0.005 , and ± 0.009 , respectively. The local surface-pressure measurements are estimated to be accurate within 1.5 lb/sq ft. The model angle of attack is accurate within $\pm 0.20^\circ$. The maximum variation of the actual test Mach numbers from the presented nominal values is less than ± 0.01 . All data presented from this investigation are essentially free of wall-reflected disturbances.

PRESENTATION OF RESULTS

Although the model was instrumented with orifices only along the lower surface (model at $\phi = 0^\circ$), it was possible, through the proper combination of pressure data from the various test conditions, to simulate the pressure distribution completely about the model at angles of attack of 4° and 8° . Inasmuch as the tank was instrumented with 16 circumferentially located orifices at each of 6 axial locations, it was possible to obtain the pressure distributions about the tank at all angles of attack and roll tested. The pressure results for both the model and the model tank were integrated to obtain section normal-force coefficients and, in addition, the pressure results for the model tank were also integrated

to obtain section side-force coefficients. Overall model or model-tank force and moment coefficients were then obtained by integration of the section coefficients.

The data obtained from this investigation are presented in the following tables and figures:

Table

| | |
|---|------|
| Pressure coefficients for Saturn model with seal strips off | III |
| Pressure coefficients for Saturn model with seal strips on | IV |
| Pressure coefficients for Saturn model tank with seal strips off | V |
| Pressure coefficients for Saturn model tank with seal strips on | VI |
| Section normal-force coefficients for Saturn model with seal strips off . . . | VII |
| Section normal-force coefficients for Saturn model with seal strips on . . . | VIII |
| Section normal-force coefficients for Saturn model tank with seal strips off | IX |
| Section normal-force coefficients for Saturn model tank with seal strips on | X |
| Section side-force coefficients for Saturn model tank with seal strips off | XI |
| Section side-force coefficients for Saturn model tank with seal strips on | XII |

Figure

| | |
|---|----|
| Variation of static longitudinal characteristics of model with angle of attack | 5 |
| Summary of static longitudinal characteristics of model and comparison of center-of-pressure locations with estimated center-of-gravity locations | 6 |
| Variation of static aerodynamic characteristics of model tank with angle of attack. Seal strips off | 7 |
| Variation of center-of-pressure location of model tank with angle of attack. Seal strips off. $\phi = 0^\circ$ | 8 |
| Pressure coefficients for model with seal strips on. Orifices located on lower surface. $\phi = 0^\circ$ | 9 |
| Section normal-force coefficients for model with seal strips on | 10 |
| Comparison of model normal-force and pitching-moment results obtained from pressure tests with those obtained from force tests. $M = 1.20$; seal strips on | 11 |
| Pressure coefficients for model tank. $\alpha = 0^\circ$ | 12 |
| Section normal-force coefficients for model tank. $\phi = 0^\circ$ | 13 |
| Comparison of model-tank static aerodynamic characteristics obtained from pressure tests with results from force tests. Seal strips off | 14 |
| Effect of seal strips on model-tank static aerodynamic characteristics (results from pressure tests) | 15 |

RESULTS AND DISCUSSION

Force-Test Results

Model.- The variations of model pitching-moment and normal-force coefficients with angle of attack are essentially linear for all Mach numbers investigated and are unaffected by the addition of seal strips between the tanks. (See fig. 5.) A rearward shift in the center-of-pressure location (about 0.65 model diameters) occurs at Mach numbers near 1.00. (See fig. 6.) A comparison of the center-of-pressure locations with estimated center-of-gravity locations indicates that the model is unstable at all Mach numbers tested.

Model tank.- The variations of tank pitching-moment and normal-force coefficients with angle of attack (fig. 7) are essentially symmetrical about an angle of attack of 0° . It is shown, however, that the effects of roll angle (or tank location on model) are prominent at the higher angles of attack in that the normal force changes from an inward acting force at $\phi = 0^\circ$ to an outward acting force at $\phi = 90^\circ$ with a corresponding change in pitching-moment coefficient from a negative value to a positive value. As would be expected, the values of side-force and yawing-moment coefficients increase with angle of attack for all roll angles tested except 0° . The location of the center of pressure of the model tank shifts forward as the angle of attack is varied from 0° ($\phi = 0^\circ$). (See fig. 8.)

Pressure-Distribution Results

Model.- The effects of increasing Mach number on the local pressure coefficients for the model tested are shown in figure 9. Comparison of the results indicates a general decrease in the magnitude of the negative pressure peaks associated with the junctures at the nose and rear portions of the transition sections and a broadening of these peaks as Mach number is increased. Also shown in this figure are the effects of angle of attack at Mach numbers of 1.20 and 1.30. The greatest variations in pressure coefficient due to angle of attack occur over the nose, the transition flares, and the base flares.

Variations of model section normal-force coefficient with longitudinal body station are presented in figure 10 for Mach numbers of 1.20 and 1.30 and angles of attack of 4° and 8° . As would be expected, the results indicate that the nose and flares carry the major portion of the normal force. It is pointed out, however, that inaccuracies may exist in the integrated values of section normal-force coefficient for the tank and flare portions of the model. In the region of the tanks the model was assumed to be cylindrical in that data only from the outermost row of tank orifices were used to determine the model section normal-force coefficients. In the region of the base flare the model was assumed to be conical as data were available from orifices located only on the surface having maximum flare angle.

Comparisons of results obtained from integrations of the plots presented in figure 10 with the force results given in figure 5 are presented in figure 11. In general, the results are in fair agreement with one another.

Model tank.- Variations of local pressure coefficient with longitudinal station for the tanks are shown in figure 12 for meridian angles of 0° , 90° , and 180° at Mach numbers of 1.20 and 1.30 with seal strips on and off. The results, for an angle of attack of 0° , indicate essentially no effect of Mach number on the general trends. As might be expected, the seal strips have little effect on the pressure coefficients at meridian angles (θ) of 0° and 90° but have a large influence on the pressure coefficients at a meridian angle of 180° . It may be seen (fig. 12(c)) that with the seal strips on the variations of pressure coefficients with longitudinal station for the 180° meridian become essentially linear and, except for the most forward longitudinal stations, the coefficients are considerably more negative than for the 0° and 90° meridians.

It is indicated in figure 13 that the variations of model-tank section normal-force coefficient with longitudinal station are, except for magnitude, similar with the seal strips on or off and that the load is a maximum at the rear of the tank.

Comparisons of results obtained from integrations of the data from pressure tests with seal strips off with data from the force tests are, in general, in close agreement. (See fig. 14.) It is pointed out that due to the fact that the force and pressure tanks were located 180° apart on the model the signs of the angles of attack for the pressure data of figure 14 have been reversed.

It is shown, figure 15, that the seal strips have a considerable effect on the force and moment characteristics of the model tank. For example, the normal-force and pitching-moment coefficients for a Mach number of 1.20 and $\phi = 0^\circ$ (fig. 15(a)) are both increased by a factor of about 11 at an angle of attack of 0° .

CONCLUSIONS

Static aerodynamic characteristics and pressure distributions of a model of a three-stage Saturn launch vehicle with and without seal strips between the tanks were investigated in the Langley 8-foot transonic pressure tunnel. In addition, force and pressure distributions on one of the first-stage fuel tanks were determined with the tanks in place on the model. The results of the investigation warrant the following conclusions:

1. The variations of model pitching-moment and normal-force coefficients with angle of attack are essentially linear for all Mach numbers tested and are unaffected by the addition of seal strips between the tanks.
2. A comparison of the center-of-pressure locations with estimated center-of-gravity locations indicates that the model is unstable at all Mach numbers tested.

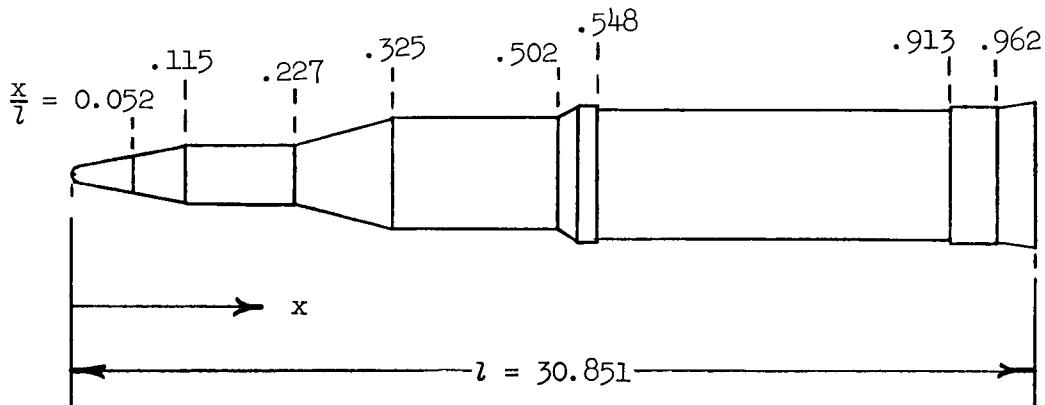
3. The seal strips have a considerable effect on the force and moment characteristics of the model tank in that the normal-force and pitching-moment coefficients are increased in magnitude by a factor of as much as 11 by the addition of the seal strips.

Langley Research Center,
National Aeronautics and Space Administration,
Langley Station, Hampton, Va., August 21, 1962.

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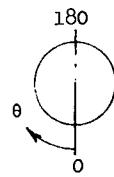
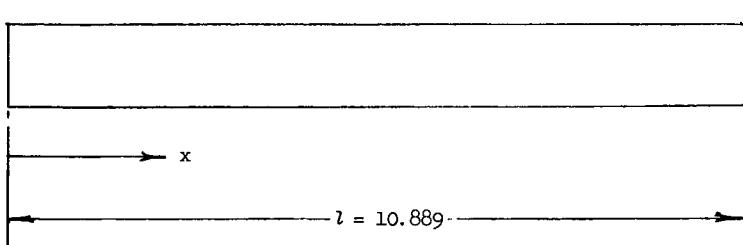
1. Pearson, Albin O.: Wind-tunnel Investigation at Mach Numbers From 0.30 to 1.20 of the Static Aerodynamic Characteristics of a Two-Stage Saturn Launch Vehicle. NASA TM X-601, 1961.
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TABLE I.- ORIFICE LOCATIONS FOR SATURN MODEL



| Model orifice station, x , in. | x/l | Model orifice station, x , in. | x/l |
|----------------------------------|-------|----------------------------------|-------|
| 0.772 | 0.025 | 12.273 | 0.398 |
| 1.272 | .041 | 13.647 | .442 |
| 1.771 | .057 | 14.147 | .491 |
| 2.398 | .078 | 15.398 | .499 |
| 2.922 | .098 | 15.522 | .503 |
| 3.398 | .110 | 15.647 | .507 |
| 3.644 | .118 | 15.774 | .511 |
| 4.020 | .130 | 15.898 | .515 |
| 4.395 | .142 | 16.022 | .519 |
| 4.771 | .155 | 16.147 | .523 |
| 5.143 | .167 | 16.334 | .529 |
| 5.518 | .179 | 16.584 | .538 |
| 5.893 | .191 | 17.493 | .567 |
| 6.899 | .224 | 18.572 | .602 |
| 7.150 | .232 | 19.991 | .648 |
| 7.651 | .248 | 21.935 | .711 |
| 8.152 | .264 | 24.989 | .810 |
| 8.651 | .280 | 27.581 | .894 |
| 9.152 | .297 | 29.920 | .970 |
| 9.901 | .321 | 30.108 | .976 |
| 10.152 | .329 | 30.295 | .982 |
| 10.400 | .337 | 30.483 | .988 |
| 11.273 | .365 | 30.733 | .996 |

TABLE II.- ORIFICE LOCATIONS FOR SATURN MODEL TANK



| Tank orifice station, x, in. | x/l | Angular location of tank orifice, θ , deg | Tank orifice station, x, in. | x/l | Angular location of tank orifice, θ , deg |
|------------------------------|-------|--|------------------------------|-------|--|
| 0.218 | 0.020 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 | 4.661 | 0.428 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 |
| 1.295 | .119 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 | 7.720 | .709 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 |
| 2.722 | .250 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 | 10.312 | .947 | 0 30 45 60 90 120 135 150 180 210 225 240 270 300 315 330 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF

(a) $M = 1.20; \alpha = -8^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.190 | 0.197 | 0.183 | 0.187 | 0.213 |
| .041 | .172 | .177 | .173 | .183 | .221 |
| .057 | .113 | .115 | .117 | .137 | .177 |
| .078 | .139 | .136 | .137 | .147 | .185 |
| .098 | .135 | .138 | .135 | .143 | .178 |
| .110 | .115 | .120 | .123 | .131 | .168 |
| .118 | -.367 | -.376 | -.383 | -.383 | -.373 |
| .130 | -.314 | -.323 | -.335 | -.337 | -.318 |
| .142 | -.256 | -.262 | -.276 | -.283 | -.259 |
| .155 | -.209 | -.210 | -.222 | -.240 | -.225 |
| .167 | -.149 | -.159 | -.177 | -.198 | -.192 |
| .179 | ---- | ---- | ---- | -.175 | -.175 |
| .191 | .113 | .113 | .060 | -.066 | -.157 |
| .224 | .261 | .241 | .216 | .259 | .316 |
| .232 | .279 | .259 | .254 | .285 | .374 |
| .248 | .314 | .299 | .330 | .360 | .413 |
| .264 | .322 | .322 | .328 | .335 | .360 |
| .280 | .297 | .298 | .292 | .296 | .323 |
| .297 | .257 | .261 | .260 | .270 | .296 |
| .321 | .057 | .084 | .120 | .132 | .162 |
| .329 | -.442 | -.435 | -.438 | -.429 | -.424 |
| .337 | -.344 | -.381 | -.422 | -.410 | -.398 |
| .365 | ---- | ---- | ---- | -.326 | -.295 |
| .398 | -.236 | -.228 | -.229 | -.245 | -.228 |
| .442 | .071 | .095 | .043 | .125 | .171 |
| .491 | .288 | .265 | .231 | .261 | .307 |
| .499 | .310 | .261 | .224 | .260 | .314 |
| .503 | .322 | .254 | .235 | .278 | .333 |
| .507 | .316 | .246 | .266 | .331 | .410 |
| .511 | .293 | .234 | .289 | .374 | .474 |
| .515 | .248 | .209 | .293 | .409 | .510 |
| .523 | .051 | .033 | .136 | .249 | .313 |
| .529 | -.497 | -.253 | -.325 | -.397 | -.440 |
| .538 | -.169 | -.218 | -.294 | -.357 | -.376 |
| .567 | -.211 | -.245 | -.271 | -.280 | -.280 |
| .602 | -.182 | -.197 | -.236 | -.267 | -.275 |
| .648 | -.089 | -.087 | -.111 | -.148 | -.181 |
| .711 | -.030 | -.036 | -.063 | -.096 | -.136 |
| .810 | .023 | .022 | -.019 | -.021 | -.039 |
| .894 | .128 | .122 | .122 | .113 | .092 |
| .970 | .067 | .060 | .072 | .031 | .056 |
| .976 | .017 | .020 | .021 | -.010 | .014 |
| .982 | -.036 | -.026 | -.031 | -.055 | -.037 |
| .988 | -.074 | -.066 | -.068 | -.092 | -.075 |
| .996 | -.159 | -.158 | -.156 | -.183 | -.158 |

(b) $M = 1.20; \alpha = -4^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.225 | 0.229 | 0.227 | 0.239 | 0.253 |
| .041 | .214 | .218 | .221 | .235 | .253 |
| .057 | .159 | .159 | .164 | .181 | .200 |
| .078 | .181 | .186 | .187 | .201 | .218 |
| .098 | .178 | .180 | .183 | .194 | .211 |
| .110 | .164 | .166 | .171 | .182 | .200 |
| .118 | -.355 | -.357 | -.358 | -.353 | -.346 |
| .130 | -.297 | -.297 | -.301 | -.298 | -.287 |
| .142 | -.238 | -.240 | -.241 | -.239 | -.228 |
| .155 | -.197 | -.198 | -.199 | -.199 | -.190 |
| .167 | -.151 | -.155 | -.158 | -.157 | -.153 |
| .179 | ---- | ---- | ---- | -.135 | -.131 |
| .191 | -.005 | -.020 | -.070 | -.103 | -.110 |
| .224 | .298 | .288 | .294 | .334 | .350 |
| .232 | .312 | .310 | .326 | .354 | .388 |
| .248 | .351 | .363 | .394 | .426 | .454 |
| .264 | .357 | .368 | .379 | .394 | .406 |
| .280 | .331 | .338 | .340 | .351 | .361 |
| .297 | .297 | .301 | .307 | .321 | .333 |
| .321 | .103 | .126 | .151 | .169 | .191 |
| .329 | -.398 | -.418 | -.416 | -.409 | -.405 |
| .337 | -.331 | -.376 | -.384 | -.382 | -.378 |
| .365 | ---- | ---- | ---- | -.289 | -.273 |
| .398 | -.213 | -.210 | -.206 | -.205 | -.200 |
| .442 | -.056 | -.064 | -.097 | -.120 | -.125 |
| .491 | .340 | .338 | .334 | .347 | .357 |
| .499 | .362 | .356 | .345 | .356 | .373 |
| .503 | .373 | .360 | .348 | .364 | .384 |
| .507 | .383 | .371 | .366 | .393 | .431 |
| .511 | .372 | .366 | .377 | .407 | .458 |
| .515 | .341 | .342 | .367 | .411 | .472 |
| .523 | .130 | .137 | .175 | .226 | .281 |
| .529 | -.433 | -.360 | -.337 | -.342 | -.372 |
| .538 | -.238 | -.255 | -.267 | -.278 | -.302 |
| .567 | -.225 | -.238 | -.248 | -.246 | -.253 |
| .602 | -.205 | -.210 | -.229 | -.233 | -.242 |
| .648 | -.089 | -.087 | -.095 | -.102 | -.122 |
| .711 | -.033 | -.042 | -.052 | -.053 | -.065 |
| .810 | .006 | .002 | -.004 | -.011 | -.023 |
| .894 | .137 | .143 | .147 | .164 | .173 |
| .970 | .103 | .114 | .108 | .114 | .118 |
| .976 | .055 | .059 | .059 | .072 | .077 |
| .982 | .000 | .002 | .004 | .020 | .027 |
| .988 | -.035 | -.034 | -.035 | -.019 | -.012 |
| .996 | -.123 | -.120 | -.120 | -.114 | -.105 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF - Continued

(c) $M = 1.20; \alpha = 0^\circ$

(d) $M = 1.20; \alpha = 4^\circ$

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.276 | 0.271 | 0.269 | 0.271 | 0.270 |
| .041 | .268 | .265 | .262 | .263 | .263 |
| .057 | .211 | .207 | .204 | .205 | .205 |
| .078 | .233 | .228 | .225 | .228 | .227 |
| .098 | .228 | .226 | .221 | .222 | .220 |
| .110 | .217 | .216 | .214 | .212 | .212 |
| .118 | -.335 | -.337 | -.338 | -.338 | -.340 |
| .130 | -.271 | -.272 | -.274 | -.275 | -.277 |
| .142 | -.213 | -.217 | -.217 | -.217 | -.217 |
| .155 | -.172 | -.175 | -.178 | -.177 | -.178 |
| .167 | -.137 | -.139 | -.144 | -.136 | -.138 |
| .179 | ---- | ---- | ---- | -.114 | -.113 |
| .191 | -.084 | -.088 | -.088 | -.089 | -.088 |
| .224 | .365 | .360 | .357 | .348 | .347 |
| .232 | .409 | .404 | .398 | .399 | .398 |
| .248 | .473 | .465 | .461 | .460 | .461 |
| .264 | .431 | .427 | .424 | .427 | .424 |
| .280 | .386 | .382 | .382 | .380 | .380 |
| .297 | .355 | .350 | .347 | .349 | .347 |
| .321 | .195 | .190 | .188 | .181 | .188 |
| .329 | -.395 | -.396 | -.397 | -.397 | -.404 |
| .337 | -.360 | -.361 | -.362 | -.351 | -.355 |
| .365 | ---- | ---- | ---- | -.262 | -.262 |
| .398 | -.182 | -.183 | -.186 | -.186 | -.186 |
| .442 | -.118 | -.122 | -.123 | -.118 | -.116 |
| .491 | .390 | .387 | .384 | .389 | .388 |
| .499 | .412 | .411 | .408 | .417 | .413 |
| .503 | .425 | .424 | .420 | .431 | .427 |
| .507 | .460 | .458 | .453 | .463 | .460 |
| .511 | .481 | .478 | .471 | .474 | .471 |
| .515 | .473 | .468 | .465 | .468 | .465 |
| .523 | .271 | .266 | .264 | .264 | .258 |
| .529 | -.358 | -.360 | -.362 | -.373 | -.366 |
| .538 | -.273 | -.273 | -.273 | -.273 | -.277 |
| .567 | -.235 | -.238 | -.238 | -.238 | -.238 |
| .602 | -.220 | -.221 | -.222 | -.221 | -.224 |
| .648 | -.095 | -.094 | -.088 | -.091 | -.087 |
| .711 | -.034 | -.039 | -.038 | -.039 | -.043 |
| .810 | -.008 | -.009 | -.009 | -.007 | -.008 |
| .894 | .190 | .185 | .178 | .178 | .175 |
| .970 | .242 | .243 | .238 | .230 | .227 |
| .976 | .182 | .180 | .178 | .171 | .167 |
| .982 | .107 | .106 | .102 | .099 | .095 |
| .988 | .061 | .057 | .058 | .054 | .052 |
| .996 | -.036 | -.038 | -.038 | -.041 | -.044 |

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.329 | 0.319 | 0.300 | 0.276 | 0.255 |
| .041 | .329 | .320 | .298 | .272 | .251 |
| .057 | .280 | .272 | .248 | .223 | .196 |
| .078 | .298 | .288 | .268 | .243 | .219 |
| .098 | .294 | .284 | .262 | .234 | .212 |
| .110 | .275 | .266 | .249 | .225 | .203 |
| .118 | -.314 | -.318 | -.328 | -.338 | -.346 |
| .130 | -.237 | -.245 | -.257 | -.276 | -.292 |
| .142 | -.174 | -.183 | -.196 | -.215 | -.230 |
| .155 | -.138 | -.145 | -.160 | -.181 | -.192 |
| .167 | -.110 | -.115 | -.131 | -.146 | -.155 |
| .179 | ---- | ---- | ---- | -.127 | -.133 |
| .191 | -.073 | -.079 | -.091 | -.108 | -.111 |
| .224 | .430 | .421 | .400 | .371 | .357 |
| .232 | .522 | .508 | .480 | .428 | .389 |
| .248 | .546 | .535 | .515 | .479 | .452 |
| .264 | .482 | .473 | .450 | .427 | .406 |
| .280 | .442 | .433 | .411 | .385 | .365 |
| .297 | .413 | .404 | .382 | .359 | .336 |
| .321 | .251 | .242 | .225 | .205 | .191 |
| .329 | -.377 | -.381 | -.388 | -.399 | -.406 |
| .337 | -.342 | -.348 | -.355 | -.371 | -.379 |
| .365 | ---- | ---- | ---- | -.257 | -.275 |
| .398 | -.143 | -.151 | -.165 | -.183 | -.199 |
| .442 | -.094 | -.100 | -.117 | -.126 | -.129 |
| .491 | .438 | .428 | .403 | .379 | .357 |
| .499 | .460 | .450 | .422 | .396 | .371 |
| .503 | .478 | .466 | .439 | .409 | .380 |
| .507 | .548 | .534 | .500 | .468 | .424 |
| .511 | .606 | .590 | .555 | .509 | .452 |
| .515 | .620 | .606 | .570 | .532 | .464 |
| .523 | .399 | .388 | .364 | .337 | .277 |
| .529 | -.387 | -.386 | -.382 | -.378 | -.360 |
| .538 | -.300 | -.304 | -.305 | -.309 | -.293 |
| .567 | -.228 | -.232 | -.240 | -.247 | -.253 |
| .602 | -.201 | -.206 | -.217 | -.228 | -.235 |
| .648 | -.069 | -.079 | -.094 | -.103 | -.116 |
| .711 | -.037 | -.043 | -.056 | -.064 | -.066 |
| .810 | -.009 | -.014 | -.026 | -.025 | -.021 |
| .894 | .251 | .228 | .204 | .178 | .152 |
| .970 | .328 | .340 | .311 | .242 | .190 |
| .976 | .266 | .275 | .255 | .201 | .154 |
| .982 | .180 | .187 | .178 | .140 | .100 |
| .988 | .124 | .131 | .126 | .094 | .058 |
| .996 | .018 | .025 | .019 | -.005 | -.034 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF - Continued

(e) $M = 1.20; \alpha = 8^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.393 | 0.372 | 0.323 | 0.250 | 0.215 |
| .041 | .398 | .377 | .332 | .269 | .220 |
| .057 | .357 | .337 | .287 | .227 | .172 |
| .078 | .368 | .349 | .300 | .237 | .184 |
| .098 | .356 | .338 | .289 | .222 | .175 |
| .110 | .327 | .311 | .267 | .208 | .165 |
| .118 | -.290 | -.299 | -.323 | -.352 | -.373 |
| .130 | -.189 | -.205 | -.240 | -.286 | -.319 |
| .142 | -.124 | -.138 | -.174 | -.222 | -.259 |
| .155 | -.092 | -.106 | -.143 | -.190 | -.224 |
| .167 | -.068 | -.081 | -.120 | -.168 | -.196 |
| .179 | ---- | ---- | ---- | -.157 | -.180 |
| .191 | -.046 | -.063 | -.100 | -.146 | -.161 |
| .224 | .480 | .465 | .421 | .347 | .321 |
| .232 | .626 | .604 | .544 | .451 | .370 |
| .248 | .600 | .584 | .528 | .460 | .406 |
| .264 | .541 | .520 | .467 | .405 | .371 |
| .280 | .506 | .483 | .434 | .373 | .323 |
| .297 | .474 | .454 | .405 | .346 | .297 |
| .321 | .297 | .278 | .238 | .191 | .154 |
| .329 | -.360 | -.369 | -.387 | -.408 | -.422 |
| .337 | -.310 | -.323 | -.349 | -.375 | -.397 |
| .365 | ---- | ---- | ---- | -.257 | -.260 |
| .398 | -.082 | -.099 | -.138 | -.186 | -.227 |
| .442 | -.053 | -.070 | -.108 | -.150 | -.172 |
| .491 | .510 | .482 | .424 | .367 | .302 |
| .499 | .535 | .509 | .444 | .385 | .307 |
| .503 | .565 | .536 | .471 | .411 | .328 |
| .507 | .674 | .644 | .573 | .501 | .439 |
| .511 | .756 | .726 | .655 | .567 | .470 |
| .515 | .749 | .722 | .666 | .591 | .509 |
| .523 | .467 | .448 | .409 | .358 | .314 |
| .529 | -.429 | -.436 | -.444 | -.453 | -.441 |
| .538 | -.316 | -.327 | -.348 | -.374 | -.380 |
| .567 | -.219 | -.228 | -.251 | -.271 | -.286 |
| .602 | -.176 | -.184 | -.214 | -.251 | -.280 |
| .648 | -.009 | -.050 | -.130 | -.172 | -.193 |
| .711 | -.019 | -.039 | -.093 | -.137 | -.141 |
| .810 | .002 | -.020 | -.057 | -.064 | -.047 |
| .894 | .317 | .263 | .178 | .101 | .043 |
| .970 | .372 | .414 | .346 | .259 | .167 |
| .976 | .314 | .347 | .299 | .219 | .137 |
| .982 | .231 | .252 | .222 | .163 | .089 |
| .988 | .175 | .192 | .170 | .118 | .049 |
| .996 | .068 | .079 | .063 | .021 | -.038 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF - Continued

(f) $M = 1.30; \alpha = -8^\circ$

(g) $M = 1.30; \alpha = -4^\circ$

| x/l | C _p for - | | | | | x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.178 | 0.176 | 0.167 | 0.147 | 0.180 | 0.025 | 0.223 | 0.217 | 0.215 | 0.222 | 0.239 |
| .041 | .156 | .153 | .153 | .159 | .200 | .041 | .199 | .193 | .196 | .209 | .232 |
| .057 | .102 | .101 | .102 | .110 | .152 | .057 | .145 | .144 | .146 | .164 | .187 |
| .078 | .113 | .107 | .109 | .117 | .159 | .078 | .151 | .153 | .156 | .177 | .199 |
| .098 | .116 | .112 | .108 | .116 | .151 | .098 | .153 | .150 | .153 | .168 | .194 |
| .110 | .112 | .111 | .113 | .120 | .156 | .110 | .154 | .151 | .153 | .167 | .191 |
| .118 | -.305 | -.308 | -.314 | -.312 | -.297 | .118 | -.288 | -.293 | -.296 | -.287 | -.276 |
| .130 | -.259 | -.268 | -.274 | -.277 | -.260 | .130 | -.243 | -.250 | -.255 | -.245 | -.233 |
| .142 | -.211 | -.218 | -.232 | -.237 | -.219 | .142 | -.197 | -.202 | -.209 | -.200 | -.190 |
| .155 | -.171 | -.177 | -.196 | -.211 | -.195 | .155 | -.165 | -.171 | -.178 | -.170 | -.167 |
| .167 | -.133 | -.141 | -.163 | -.186 | -.172 | .167 | -.133 | -.136 | -.143 | -.141 | -.140 |
| .179 | ---- | ---- | ---- | -.168 | -.167 | .179 | ---- | ---- | ---- | -.129 | -.125 |
| .191 | -.053 | -.065 | -.105 | -.146 | -.153 | .191 | -.080 | -.087 | -.097 | -.105 | -.107 |
| .224 | .224 | .205 | .193 | .229 | .255 | .224 | .261 | .256 | .254 | .269 | .286 |
| .232 | .261 | .229 | .232 | .258 | .328 | .232 | .287 | .283 | .290 | .318 | .355 |
| .248 | .310 | .273 | .290 | .303 | .362 | .248 | .331 | .328 | .344 | .366 | .402 |
| .264 | .307 | .278 | .281 | .285 | .315 | .264 | .324 | .321 | .326 | .342 | .359 |
| .280 | .276 | .258 | .251 | .256 | .282 | .280 | .296 | .288 | .290 | .304 | .318 |
| .297 | .242 | .232 | .230 | .241 | .267 | .297 | .265 | .263 | .263 | .284 | .299 |
| .321 | .114 | .101 | .139 | .158 | .193 | .321 | .138 | .144 | .166 | .190 | .215 |
| .329 | -.366 | -.342 | -.346 | -.335 | -.327 | .329 | -.331 | -.331 | -.330 | -.319 | -.312 |
| .337 | -.349 | -.281 | -.335 | -.324 | -.312 | .337 | -.290 | -.293 | -.311 | -.305 | -.294 |
| .365 | ---- | ---- | ---- | -.258 | -.238 | .365 | ---- | ---- | ---- | -.220 | -.224 |
| .398 | -.190 | -.193 | -.209 | -.209 | -.193 | .398 | -.171 | -.177 | -.189 | -.173 | -.172 |
| .442 | -.061 | -.044 | -.110 | -.158 | -.170 | .442 | -.115 | -.116 | -.127 | -.125 | -.129 |
| .491 | .263 | .235 | .205 | .222 | .251 | .491 | .294 | .287 | .278 | .294 | .302 |
| .499 | .290 | .242 | .199 | .215 | .252 | .499 | .315 | .306 | .291 | .303 | .313 |
| .503 | .307 | .244 | .210 | .228 | .265 | .503 | .326 | .310 | .292 | .310 | .321 |
| .507 | .315 | .244 | .234 | .271 | .330 | .507 | .341 | .327 | .317 | .340 | .364 |
| .511 | .311 | .236 | .252 | .306 | .395 | .511 | .346 | .332 | .330 | .363 | .399 |
| .515 | .286 | .211 | .257 | .339 | .450 | .515 | .329 | .321 | .333 | .375 | .426 |
| .523 | .131 | .054 | .130 | .235 | .332 | .523 | .159 | .158 | .181 | .232 | .292 |
| .529 | -.399 | -.180 | -.231 | -.278 | -.308 | .529 | -.314 | -.262 | -.244 | -.256 | -.257 |
| .538 | -.303 | -.167 | -.214 | -.258 | -.275 | .538 | -.198 | -.192 | -.203 | -.210 | -.220 |
| .567 | -.174 | -.214 | -.229 | -.235 | -.240 | .567 | -.190 | -.203 | -.213 | -.199 | -.214 |
| .602 | -.160 | -.178 | -.218 | -.232 | -.250 | .602 | -.175 | -.186 | -.206 | -.194 | -.210 |
| .648 | -.076 | -.085 | -.112 | -.150 | -.188 | .648 | -.083 | -.092 | -.105 | -.101 | -.121 |
| .711 | -.037 | -.043 | -.060 | -.088 | -.133 | .711 | -.042 | -.047 | -.056 | -.059 | -.069 |
| .810 | .005 | .001 | -.023 | -.041 | -.058 | .810 | -.005 | -.010 | -.021 | -.024 | -.031 |
| .894 | .145 | .148 | .122 | .106 | .061 | .894 | .146 | .147 | .145 | .155 | .164 |
| .970 | .095 | .128 | .090 | .053 | .068 | .970 | .135 | .152 | .126 | .128 | .134 |
| .976 | .052 | .073 | .044 | .019 | .034 | .976 | .090 | .097 | .083 | .090 | .103 |
| .982 | .007 | .023 | .001 | -.018 | -.011 | .982 | .042 | .042 | .035 | .047 | .059 |
| .988 | -.024 | -.010 | -.030 | -.051 | -.042 | .988 | -.009 | -.010 | -.000 | -.013 | .027 |
| .996 | -.102 | -.087 | -.107 | -.132 | -.110 | .996 | -.064 | -.063 | -.072 | -.067 | -.055 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF - Continued

(h) $M = 1.30; \alpha = 0^\circ$

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.264 | 0.260 | 0.260 | 0.257 | 0.264 |
| .041 | .258 | .253 | .251 | .248 | .249 |
| .057 | .207 | .203 | .200 | .194 | .196 |
| .078 | .209 | .206 | .205 | .207 | .208 |
| .098 | .207 | .207 | .207 | .204 | .209 |
| .110 | .209 | .207 | .207 | .203 | .205 |
| .118 | -.264 | -.266 | -.266 | -.268 | -.268 |
| .130 | -.216 | -.219 | -.222 | -.222 | -.222 |
| .142 | -.175 | -.178 | -.182 | -.180 | -.178 |
| .155 | -.147 | -.151 | -.153 | -.154 | -.149 |
| .167 | -.118 | -.123 | -.122 | -.123 | -.119 |
| .179 | ---- | ---- | ---- | -.128 | -.102 |
| .191 | -.080 | -.081 | -.081 | -.087 | -.082 |
| .224 | .310 | .303 | .298 | .274 | .299 |
| .232 | .373 | .366 | .364 | .347 | .361 |
| .248 | .413 | .407 | .402 | .394 | .405 |
| .264 | .375 | .370 | .368 | .364 | .368 |
| .280 | .336 | .333 | .330 | .324 | .329 |
| .297 | .318 | .312 | .311 | .307 | .306 |
| .321 | .219 | .215 | .214 | .203 | .214 |
| .329 | -.304 | -.307 | -.306 | -.303 | -.308 |
| .337 | -.280 | -.285 | -.283 | -.275 | -.282 |
| .365 | ---- | ---- | ---- | -.217 | -.215 |
| .398 | -.159 | -.166 | -.166 | -.165 | -.161 |
| .442 | -.107 | -.112 | -.117 | -.117 | -.115 |
| .491 | .340 | .333 | .328 | .328 | .328 |
| .499 | .365 | .357 | .351 | .356 | .350 |
| .503 | .375 | .368 | .363 | .371 | .361 |
| .507 | .415 | .407 | .399 | .413 | .397 |
| .511 | .446 | .438 | .430 | .435 | .418 |
| .515 | .452 | .444 | .437 | .443 | .428 |
| .523 | .298 | .292 | .284 | .280 | .275 |
| .529 | -.256 | -.258 | -.257 | -.278 | -.256 |
| .538 | -.203 | -.206 | -.202 | -.211 | -.203 |
| .567 | -.195 | -.199 | -.201 | -.203 | -.197 |
| .602 | -.187 | -.189 | -.190 | -.197 | -.189 |
| .648 | -.083 | -.089 | -.087 | -.100 | -.086 |
| .711 | -.041 | -.044 | -.043 | -.057 | -.047 |
| .810 | -.008 | -.011 | -.021 | -.024 | -.017 |
| .894 | .187 | .181 | .180 | .167 | .172 |
| .970 | .262 | .260 | .253 | .240 | .243 |
| .976 | .213 | .207 | .204 | .193 | .194 |
| .982 | .145 | .140 | .137 | .132 | .130 |
| .988 | .102 | .099 | .096 | .093 | .091 |
| .996 | .014 | .012 | .011 | .010 | .006 |

(i) $M = 1.30; \alpha = 4^\circ$

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.310 | 0.299 | 0.279 | 0.257 | 0.232 |
| .041 | .307 | .293 | .275 | .254 | .230 |
| .057 | .260 | .242 | .222 | .201 | .182 |
| .078 | .277 | .261 | .246 | .227 | .203 |
| .098 | .273 | .263 | .245 | .216 | .193 |
| .110 | .277 | .268 | .245 | .217 | .191 |
| .118 | -.234 | -.241 | -.251 | -.263 | -.276 |
| .130 | -.181 | -.186 | -.201 | -.218 | -.232 |
| .142 | -.139 | -.146 | -.157 | -.177 | -.191 |
| .155 | -.115 | -.121 | -.135 | -.151 | -.163 |
| .167 | -.095 | -.103 | -.113 | -.130 | -.138 |
| .179 | ---- | ---- | ---- | -.126 | -.120 |
| .191 | -.067 | -.076 | -.087 | -.096 | -.100 |
| .224 | .329 | .324 | .308 | .257 | .289 |
| .232 | .462 | .455 | .421 | .348 | .359 |
| .248 | .486 | .473 | .448 | .414 | .399 |
| .264 | .430 | .421 | .399 | .379 | .357 |
| .280 | .397 | .386 | .367 | .342 | .318 |
| .297 | .371 | .361 | .338 | .315 | .294 |
| .321 | .278 | .268 | .245 | .226 | .209 |
| .329 | -.283 | -.289 | -.295 | -.307 | -.315 |
| .337 | -.259 | -.268 | -.275 | -.292 | -.297 |
| .365 | ---- | ---- | ---- | -.214 | -.231 |
| .398 | -.125 | -.134 | -.149 | -.157 | -.176 |
| .442 | -.091 | -.099 | -.111 | -.121 | -.132 |
| .491 | .375 | .363 | .341 | .322 | .299 |
| .499 | .396 | .381 | .359 | .335 | .308 |
| .503 | .411 | .395 | .373 | .329 | .318 |
| .507 | .482 | .463 | .434 | .404 | .361 |
| .511 | .552 | .533 | .496 | .451 | .398 |
| .515 | .590 | .571 | .532 | .488 | .423 |
| .523 | .436 | .425 | .390 | .353 | .296 |
| .529 | .267 | .272 | .269 | .264 | .255 |
| .538 | .213 | .222 | .227 | .224 | .218 |
| .567 | .192 | .196 | .204 | .208 | .210 |
| .602 | -.177 | -.181 | -.190 | -.194 | -.203 |
| .648 | -.072 | -.082 | -.100 | -.112 | -.118 |
| .711 | -.035 | -.045 | -.059 | -.066 | -.068 |
| .810 | -.012 | -.022 | -.033 | -.034 | -.029 |
| .894 | .234 | .208 | .191 | .171 | .152 |
| .970 | .332 | .339 | .319 | .240 | .197 |
| .976 | .286 | .295 | .277 | .208 | .171 |
| .982 | .211 | .217 | .205 | .160 | .127 |
| .988 | .163 | .167 | .158 | .124 | .094 |
| .996 | .066 | .068 | .060 | .039 | .013 |

TABLE III.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS OFF - Concluded

(j) $M = 1.30; \alpha = 8^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.402 | 0.367 | 0.317 | 0.239 | 0.188 |
| .041 | .395 | .366 | .328 | .260 | .207 |
| .057 | .351 | .319 | .283 | .216 | .159 |
| .078 | .357 | .332 | .287 | .220 | .164 |
| .098 | .345 | .324 | .275 | .211 | .160 |
| .110 | .340 | .323 | .276 | .212 | .159 |
| .118 | -.205 | -.214 | -.238 | -.270 | -.297 |
| .120 | -.137 | -.150 | -.182 | -.225 | -.260 |
| .142 | -.091 | -.104 | -.139 | -.187 | -.221 |
| .155 | -.070 | -.082 | -.117 | -.168 | -.200 |
| .167 | -.051 | -.064 | -.101 | -.147 | -.178 |
| .179 | ---- | ---- | ---- | -.144 | -.182 |
| .191 | -.034 | -.053 | -.085 | -.134 | -.154 |
| .224 | .342 | .316 | .284 | .167 | .207 |
| .232 | .546 | .518 | .457 | .325 | .308 |
| .248 | .531 | .508 | .464 | .399 | .357 |
| .264 | .484 | .464 | .413 | .351 | .304 |
| .280 | .457 | .439 | .389 | .325 | .274 |
| .297 | .448 | .427 | .377 | .316 | .265 |
| .321 | .341 | .322 | .278 | .226 | .182 |
| .329 | -.260 | -.267 | -.287 | -.311 | -.334 |
| .337 | -.230 | -.239 | -.265 | -.294 | -.318 |
| .365 | ---- | ---- | ---- | -.217 | -.250 |
| .398 | -.079 | -.094 | -.131 | -.171 | -.206 |
| .442 | -.056 | -.074 | -.110 | -.143 | -.176 |
| .491 | .440 | .412 | .357 | .300 | .251 |
| .499 | .459 | .431 | .371 | .312 | .252 |
| .503 | .481 | .450 | .388 | .330 | .265 |
| .507 | .595 | .558 | .486 | .413 | .335 |
| .511 | .704 | .665 | .586 | .489 | .397 |
| .515 | .745 | .711 | .639 | .546 | .451 |
| .523 | .529 | .506 | .457 | .391 | .299 |
| .529 | -.306 | -.310 | -.319 | -.320 | -.311 |
| .538 | -.229 | -.239 | -.259 | -.271 | -.280 |
| .567 | -.180 | -.192 | -.214 | -.232 | -.247 |
| .602 | -.157 | -.167 | -.192 | -.222 | -.250 |
| .648 | -.018 | -.059 | -.128 | -.175 | -.188 |
| .711 | -.025 | -.043 | -.094 | -.140 | -.144 |
| .810 | -.007 | -.033 | -.070 | -.076 | -.072 |
| .894 | .302 | .248 | .178 | .101 | .045 |
| .970 | .351 | .399 | .342 | .237 | .155 |
| .976 | .311 | .359 | .308 | .211 | .136 |
| .982 | .242 | .280 | .243 | .165 | .106 |
| .988 | .198 | .229 | .199 | .137 | .077 |
| .996 | .105 | .126 | .104 | .059 | .004 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL

WITH SEAL STRIPS ON

(a) $\alpha = 0^\circ$; $\phi = 0^\circ$

| x/l | C_p for - | | | | | |
|-------|-------------|----------|----------|----------|----------|----------|
| | M = 0.80 | M = 0.90 | M = 0.95 | M = 1.00 | M = 1.03 | M = 1.15 |
| 0.025 | 0.205 | 0.231 | 0.257 | 0.299 | 0.339 | 0.288 |
| .041 | .167 | .193 | .219 | .263 | .305 | .273 |
| .057 | .128 | .154 | .182 | .228 | .269 | .222 |
| .078 | .091 | .124 | .158 | .206 | .250 | .243 |
| .098 | .002 | .054 | .097 | .152 | .194 | .234 |
| .110 | -.166 | -.060 | .002 | .072 | .118 | .209 |
| .118 | -.862 | -.869 | -.748 | -.640 | -.576 | -.391 |
| .130 | -.091 | -.522 | -.617 | -.524 | -.463 | -.316 |
| .142 | -.016 | .038 | -.297 | -.416 | -.358 | -.249 |
| .155 | -.001 | .073 | .080 | -.072 | -.105 | -.231 |
| .167 | .062 | .111 | .167 | .170 | .196 | -.159 |
| .179 | .096 | .137 | .200 | .250 | .286 | -.129 |
| .191 | .144 | .187 | .242 | .306 | .345 | -.079 |
| .224 | .397 | .453 | .484 | .525 | .558 | .383 |
| .232 | .410 | .469 | .504 | .547 | .581 | .422 |
| .248 | .265 | .317 | .365 | .430 | .470 | .495 |
| .264 | .182 | .236 | .284 | .346 | .387 | .452 |
| .280 | .110 | .170 | .221 | .284 | .326 | .398 |
| .297 | .032 | .107 | .162 | .228 | .271 | .355 |
| .321 | -.358 | -.198 | -.113 | -.032 | .019 | .143 |
| .329 | -1.263 | -.978 | -.844 | -.726 | -.661 | -.456 |
| .337 | -.525 | -.900 | -.781 | -.670 | -.603 | -.407 |
| .365 | -.071 | -.318 | -.576 | -.490 | -.430 | -.290 |
| .398 | -.009 | .071 | -.197 | -.338 | -.284 | -.199 |
| .442 | .069 | .141 | .195 | .159 | .182 | -.106 |
| .491 | .322 | .399 | .430 | .426 | .452 | .416 |
| .499 | .399 | .464 | .473 | .458 | .483 | .442 |
| .503 | .422 | .484 | .488 | .472 | .497 | .453 |
| .507 | .375 | .454 | .480 | .482 | .509 | .484 |
| .511 | .291 | .388 | .439 | .459 | .490 | .495 |
| .515 | .191 | .305 | .372 | .410 | .443 | .480 |
| .523 | -.222 | -.050 | .040 | .105 | .149 | .252 |
| .529 | -.884 | -1.105 | -.929 | -.782 | -.710 | -.437 |
| .538 | -.589 | -.931 | -.762 | -.634 | -.568 | -.330 |
| .567 | -.301 | -.386 | -.494 | -.494 | -.446 | -.307 |
| .602 | -.095 | -.223 | -.344 | -.375 | -.100 | -.241 |
| .648 | .009 | .012 | -.056 | -.125 | -.096 | -.066 |
| .711 | .007 | .031 | .047 | -.054 | -.040 | -.029 |
| .810 | .006 | .016 | .045 | .029 | -.006 | -.004 |
| .894 | .032 | .058 | .094 | .143 | .164 | .212 |
| .970 | .038 | .026 | .062 | .124 | .148 | .242 |
| .976 | -.014 | -.032 | -.022 | .035 | .058 | .165 |
| .982 | -.059 | -.087 | -.107 | -.055 | -.032 | .085 |
| .988 | -.079 | -.113 | -.159 | -.108 | -.083 | .038 |
| .996 | -.135 | -.166 | -.256 | -.222 | -.198 | -.064 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS ON - Continued

(b) $M = 1.20; \alpha = -8^\circ$

(c) $M = 1.20; \alpha = -4^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.246 | 0.188 | 0.185 | 0.189 | 0.214 |
| .041 | .171 | .170 | .172 | .189 | .223 |
| .057 | .113 | .109 | .115 | .138 | .180 |
| .078 | .139 | .137 | .136 | .149 | .187 |
| .098 | .137 | .134 | .134 | .147 | .180 |
| .110 | .120 | .119 | .125 | .137 | .171 |
| .118 | -.364 | -.375 | -.380 | -.382 | -.371 |
| .130 | -.308 | -.322 | -.333 | -.334 | -.315 |
| .142 | -.213 | -.261 | -.275 | -.277 | -.258 |
| .155 | -.229 | -.217 | -.229 | -.234 | -.221 |
| .167 | -.154 | -.162 | -.177 | -.192 | -.192 |
| .179 | -.082 | -.099 | -.142 | -.168 | -.174 |
| .191 | .109 | .106 | .045 | -.093 | -.154 |
| .224 | .259 | .241 | .223 | .257 | .331 |
| .232 | .276 | .257 | .263 | .307 | .398 |
| .248 | .315 | .298 | .336 | .372 | .420 |
| .264 | .323 | .319 | .328 | .333 | .361 |
| .280 | .298 | .298 | .293 | .296 | .324 |
| .297 | .260 | .262 | .260 | .268 | .298 |
| .321 | .048 | .077 | .114 | .134 | .156 |
| .329 | -.442 | -.438 | -.436 | -.432 | -.423 |
| .337 | -.340 | -.380 | -.418 | -.413 | -.399 |
| .365 | -.285 | -.293 | -.333 | -.325 | -.293 |
| .398 | -.233 | -.229 | -.229 | -.249 | -.222 |
| .442 | .072 | .103 | .051 | -.126 | -.172 |
| .491 | .292 | .260 | .229 | .257 | .308 |
| .499 | .312 | .256 | .224 | .256 | .315 |
| .503 | .322 | .247 | .233 | .272 | .335 |
| .507 | .318 | .244 | .267 | .329 | .411 |
| .511 | .295 | .230 | .286 | .378 | .476 |
| .515 | .257 | .210 | .294 | .411 | .513 |
| .523 | .061 | .039 | .144 | .252 | .314 |
| .529 | -.490 | -.252 | -.320 | -.402 | -.440 |
| .538 | -.179 | -.217 | -.293 | -.359 | -.376 |
| .567 | -.229 | -.273 | -.303 | -.323 | -.318 |
| .602 | -.171 | -.165 | -.221 | -.274 | -.284 |
| .648 | -.069 | -.067 | -.081 | -.118 | -.158 |
| .711 | -.025 | -.025 | -.054 | -.093 | -.126 |
| .810 | -.001 | .004 | -.019 | -.065 | -.105 |
| .894 | .152 | .146 | .187 | .190 | .192 |
| .970 | .071 | .065 | .075 | .043 | .055 |
| .976 | .019 | .019 | .020 | -.001 | .015 |
| .982 | -.032 | -.030 | -.034 | -.049 | -.034 |
| .988 | -.070 | -.070 | -.074 | -.091 | -.070 |
| .996 | -.159 | -.158 | -.161 | -.185 | -.155 |

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.230 | 0.231 | 0.231 | 0.242 | 0.254 |
| .041 | .212 | .218 | .224 | .242 | .256 |
| .057 | .153 | .159 | .164 | .182 | .202 |
| .078 | .177 | .183 | .188 | .204 | .219 |
| .098 | .174 | .179 | .185 | .197 | .212 |
| .110 | .164 | .165 | .173 | .188 | .204 |
| .118 | -.355 | -.357 | -.355 | -.350 | -.345 |
| .130 | -.298 | -.299 | -.300 | -.290 | -.284 |
| .142 | -.235 | -.240 | -.242 | -.234 | -.226 |
| .155 | -.220 | -.201 | -.203 | -.192 | -.186 |
| .167 | -.151 | -.153 | -.158 | -.153 | -.151 |
| .179 | -.117 | -.121 | -.127 | -.130 | -.130 |
| .191 | -.007 | -.033 | -.079 | -.099 | -.108 |
| .224 | .296 | .289 | .297 | .324 | .350 |
| .232 | .310 | .311 | .330 | .366 | .404 |
| .248 | .349 | .366 | .397 | .432 | .463 |
| .264 | .354 | .369 | .381 | .397 | .410 |
| .280 | .330 | .339 | .343 | .354 | .365 |
| .297 | .294 | .302 | .309 | .324 | .337 |
| .321 | .089 | .122 | .146 | .172 | .186 |
| .329 | -.399 | -.415 | -.413 | -.405 | -.403 |
| .337 | -.325 | -.370 | -.380 | -.376 | -.372 |
| .365 | -.271 | -.267 | -.287 | -.283 | -.273 |
| .398 | -.210 | -.204 | -.200 | -.199 | -.197 |
| .442 | -.060 | -.075 | -.107 | -.117 | -.121 |
| .491 | .338 | .337 | .334 | .345 | .359 |
| .499 | .359 | .353 | .343 | .356 | .371 |
| .503 | .367 | .357 | .346 | .362 | .382 |
| .507 | .377 | .367 | .367 | .394 | .425 |
| .511 | .367 | .361 | .372 | .412 | .454 |
| .515 | .340 | .341 | .366 | .415 | .470 |
| .523 | .130 | .140 | .181 | .232 | .282 |
| .529 | -.438 | -.359 | -.336 | -.339 | -.359 |
| .538 | -.239 | -.255 | -.266 | -.279 | -.293 |
| .567 | -.251 | -.269 | -.282 | -.282 | -.283 |
| .602 | -.181 | -.188 | -.205 | -.233 | -.241 |
| .648 | -.065 | -.062 | -.064 | -.062 | -.074 |
| .711 | -.029 | -.033 | -.041 | -.044 | -.049 |
| .810 | -.006 | -.012 | -.020 | -.027 | -.041 |
| .894 | .154 | .164 | .180 | .212 | .226 |
| .970 | .108 | .121 | .120 | .131 | .134 |
| .976 | .056 | .061 | .063 | .081 | .089 |
| .982 | .000 | .004 | .008 | .028 | .035 |
| .988 | -.036 | -.031 | -.030 | -.014 | -.004 |
| .996 | -.123 | -.115 | -.118 | -.107 | -.098 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL

WITH SEAL STRIPS ON - Continued

(d) $M = 1.20; \alpha = 0^\circ$ (e) $M = 1.20; \alpha = 4^\circ$

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| .025 | 0.272 | 0.270 | 0.266 | 0.268 | 0.266 |
| .041 | .266 | .265 | .261 | .263 | .262 |
| .057 | .208 | .206 | .203 | .206 | .204 |
| .078 | .231 | .230 | .227 | .227 | .224 |
| .098 | .225 | .224 | .222 | .221 | .218 |
| .110 | .219 | .214 | .210 | .215 | .210 |
| .118 | -.337 | -.337 | -.338 | -.336 | -.338 |
| .130 | -.271 | -.272 | -.277 | -.273 | -.275 |
| .142 | -.213 | -.213 | -.216 | -.216 | -.218 |
| .155 | -.200 | -.179 | -.181 | -.176 | -.178 |
| .167 | -.137 | -.137 | -.138 | -.139 | -.139 |
| .179 | -.112 | -.112 | -.114 | -.111 | -.114 |
| .191 | -.086 | -.086 | -.091 | -.089 | -.089 |
| .224 | .362 | .361 | .358 | .360 | .356 |
| .232 | .407 | .405 | .401 | .400 | .397 |
| .248 | .470 | .466 | .462 | .462 | .458 |
| .264 | .429 | .428 | .425 | .425 | .422 |
| .280 | .385 | .383 | .380 | .380 | .379 |
| .297 | .354 | .352 | .348 | .348 | .347 |
| .321 | .178 | .185 | .182 | .186 | .182 |
| .329 | -.393 | -.393 | -.395 | -.395 | -.398 |
| .337 | -.354 | -.355 | -.359 | -.356 | -.359 |
| .365 | -.255 | -.253 | -.255 | -.255 | -.261 |
| .398 | -.183 | -.181 | -.184 | -.182 | -.187 |
| .442 | -.115 | -.110 | -.117 | -.116 | -.116 |
| .491 | .390 | .390 | .386 | .388 | .385 |
| .499 | .413 | .413 | .408 | .411 | .409 |
| .503 | .425 | .424 | .418 | .421 | .417 |
| .507 | .461 | .462 | .453 | .454 | .451 |
| .511 | .480 | .474 | .469 | .470 | .466 |
| .515 | .475 | .471 | .465 | .466 | .462 |
| .523 | .282 | .274 | .266 | .262 | .259 |
| .529 | -.357 | -.360 | -.358 | -.357 | -.357 |
| .538 | -.274 | -.275 | -.274 | -.269 | -.269 |
| .567 | -.272 | -.271 | -.270 | -.270 | -.268 |
| .602 | -.223 | -.218 | -.214 | -.215 | -.218 |
| .648 | -.045 | -.041 | -.056 | -.052 | -.053 |
| .711 | -.024 | -.028 | -.035 | -.030 | -.033 |
| .810 | -.022 | -.023 | -.025 | -.021 | -.024 |
| .894 | .202 | .202 | .199 | .197 | .194 |
| .970 | .256 | .256 | .255 | .252 | .249 |
| .976 | .185 | .184 | .184 | .183 | .179 |
| .982 | .107 | .108 | .108 | .107 | .102 |
| .988 | .062 | .062 | .062 | .062 | .058 |
| .996 | -.037 | -.036 | -.035 | -.033 | -.039 |

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.321 | 0.318 | 0.296 | 0.273 | 0.247 |
| .041 | .328 | .322 | .300 | .277 | .250 |
| .057 | .280 | .273 | .253 | .225 | .195 |
| .078 | .293 | .289 | .268 | .244 | .218 |
| .098 | .281 | .277 | .256 | .234 | .209 |
| .110 | .272 | .264 | .245 | .223 | .200 |
| .118 | -.318 | -.318 | -.329 | -.336 | -.348 |
| .130 | -.240 | -.241 | -.257 | -.273 | -.288 |
| .142 | -.180 | -.180 | -.199 | -.213 | -.233 |
| .155 | -.174 | -.150 | -.169 | -.178 | -.189 |
| .167 | -.111 | -.115 | -.132 | -.143 | -.160 |
| .179 | -.096 | -.099 | -.111 | -.124 | -.135 |
| .191 | -.077 | -.083 | -.097 | -.105 | -.113 |
| .224 | .422 | .419 | .399 | .379 | .349 |
| .232 | .517 | .509 | .480 | .445 | .402 |
| .248 | .545 | .536 | .514 | .488 | .458 |
| .264 | .479 | .471 | .451 | .426 | .406 |
| .280 | .440 | .431 | .411 | .386 | .363 |
| .297 | .410 | .404 | .381 | .358 | .332 |
| .321 | .228 | .233 | .215 | .203 | .182 |
| .329 | -.380 | -.380 | -.389 | -.396 | -.406 |
| .337 | -.336 | -.341 | -.353 | -.366 | -.379 |
| .365 | -.219 | -.217 | -.234 | -.253 | -.277 |
| .398 | -.143 | -.142 | -.161 | -.181 | -.202 |
| .442 | -.090 | -.093 | -.110 | -.124 | -.131 |
| .491 | .435 | .427 | .402 | .379 | .349 |
| .499 | .458 | .447 | .420 | .394 | .362 |
| .503 | .474 | .462 | .437 | .408 | .370 |
| .507 | .544 | .532 | .500 | .465 | .420 |
| .511 | .600 | .582 | .551 | .508 | .454 |
| .515 | .621 | .605 | .571 | .530 | .472 |
| .523 | .401 | .393 | .369 | .334 | .288 |
| .529 | -.389 | -.389 | -.386 | -.377 | -.364 |
| .538 | -.296 | -.302 | -.306 | -.306 | -.302 |
| .567 | -.255 | -.256 | -.270 | -.278 | -.287 |
| .602 | -.209 | -.032 | -.224 | -.235 | -.247 |
| .648 | -.043 | -.036 | -.060 | -.073 | -.081 |
| .711 | -.005 | -.017 | -.051 | -.061 | -.061 |
| .810 | -.024 | -.029 | -.042 | -.047 | -.047 |
| .894 | .254 | .236 | .222 | .205 | .180 |
| .970 | .333 | .341 | .318 | .243 | .191 |
| .976 | .259 | .268 | .251 | .199 | .150 |
| .982 | .171 | .183 | .172 | .141 | .096 |
| .988 | .121 | .130 | .121 | .092 | .056 |
| .996 | .019 | .023 | .016 | -.007 | -.037 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL

WITH SEAL STRIPS ON - Continued

(f) $M = 1.20; \alpha = 8^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.377 | 0.371 | 0.323 | 0.246 | 0.213 |
| .041 | .393 | .374 | .327 | .269 | .215 |
| .057 | .356 | .337 | .289 | .227 | .166 |
| .078 | .365 | .346 | .297 | .237 | .179 |
| .098 | .352 | .334 | .289 | .227 | .172 |
| .110 | .332 | .311 | .269 | .213 | .163 |
| .118 | -.292 | -.303 | -.324 | -.350 | -.375 |
| .130 | -.190 | -.206 | -.240 | -.282 | -.319 |
| .142 | -.125 | -.139 | -.175 | -.220 | -.261 |
| .155 | -.129 | -.118 | -.150 | -.188 | -.227 |
| .167 | -.070 | -.086 | -.120 | -.162 | -.198 |
| .179 | -.060 | -.074 | -.109 | -.153 | -.181 |
| .191 | -.048 | -.063 | -.100 | -.141 | -.160 |
| .224 | .480 | .466 | .426 | .380 | .323 |
| .232 | .626 | .604 | .548 | .472 | .390 |
| .248 | .598 | .576 | .531 | .467 | .411 |
| .264 | .538 | .516 | .469 | .404 | .353 |
| .280 | .503 | .481 | .434 | .373 | .320 |
| .297 | .473 | .450 | .407 | .345 | .295 |
| .321 | .276 | .266 | .227 | .188 | .148 |
| .329 | -.362 | -.371 | -.387 | -.408 | -.427 |
| .337 | -.306 | -.323 | -.348 | -.379 | -.406 |
| .365 | -.156 | -.170 | -.205 | -.251 | -.296 |
| .398 | -.082 | -.097 | -.133 | -.180 | -.228 |
| .442 | -.055 | -.068 | -.107 | -.151 | -.180 |
| .491 | .509 | .483 | .428 | .361 | .298 |
| .499 | .536 | .509 | .450 | .378 | .305 |
| .503 | .563 | .536 | .476 | .399 | .323 |
| .507 | .676 | .645 | .580 | .492 | .405 |
| .511 | .753 | .708 | .656 | .566 | .473 |
| .515 | .753 | .708 | .670 | .596 | .512 |
| .523 | .471 | .449 | .413 | .360 | .313 |
| .529 | -.433 | -.436 | -.446 | -.456 | -.449 |
| .538 | -.318 | -.327 | -.349 | -.372 | -.384 |
| .567 | -.225 | -.244 | -.268 | -.302 | -.323 |
| .602 | -.187 | -.194 | -.219 | -.254 | -.283 |
| .648 | .004 | -.015 | -.082 | -.161 | -.172 |
| .711 | -.006 | -.039 | -.092 | -.127 | -.130 |
| .810 | -.015 | -.034 | -.076 | -.116 | -.115 |
| .894 | .296 | .231 | .187 | .112 | .089 |
| .970 | .358 | .397 | .351 | .288 | .185 |
| .976 | .297 | .326 | .293 | .237 | .147 |
| .982 | .216 | .238 | .220 | .170 | .091 |
| .988 | .169 | .184 | .171 | .124 | .051 |
| .996 | .062 | .077 | .067 | .027 | -.037 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL

WITH SEAL STRIPS ON - Continued

(g) $M = 1.30; \alpha = -8^\circ$ (h) $M = 1.30; \alpha = -4^\circ$

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.156 | 0.151 | 0.144 | 0.146 | 0.181 |
| .041 | .139 | .137 | .136 | .163 | .191 |
| .057 | .101 | .100 | .097 | .113 | .143 |
| .078 | .115 | .116 | .117 | .123 | .162 |
| .098 | .113 | .111 | .113 | .126 | .159 |
| .110 | .109 | .106 | .109 | .129 | .166 |
| .118 | -.307 | -.312 | -.316 | -.305 | -.292 |
| .130 | -.262 | -.270 | -.278 | -.269 | -.256 |
| .142 | -.210 | -.217 | -.235 | -.232 | -.214 |
| .155 | -.190 | -.180 | -.206 | -.209 | -.193 |
| .167 | -.133 | -.137 | -.165 | -.182 | -.176 |
| .179 | -.101 | -.108 | -.140 | -.162 | -.166 |
| .191 | -.050 | -.062 | -.105 | -.140 | -.149 |
| .224 | .218 | .206 | .194 | .219 | .274 |
| .232 | .255 | .229 | .233 | .267 | .386 |
| .248 | .310 | .272 | .294 | .318 | .371 |
| .264 | .305 | .276 | .286 | .289 | .320 |
| .280 | .271 | .255 | .259 | .258 | .284 |
| .297 | .238 | .232 | .236 | .244 | .277 |
| .321 | .098 | .092 | .133 | .164 | .191 |
| .329 | -.368 | -.346 | -.348 | -.332 | -.327 |
| .337 | -.346 | -.273 | -.338 | -.322 | -.313 |
| .365 | -.225 | -.226 | -.262 | -.239 | .365 |
| .398 | -.184 | -.173 | -.195 | -.219 | -.196 |
| .442 | -.069 | -.078 | -.115 | -.160 | -.169 |
| .491 | .262 | .234 | .212 | .224 | .259 |
| .499 | .289 | .241 | .207 | .217 | .260 |
| .503 | .303 | .238 | .211 | .229 | .274 |
| .507 | .315 | .239 | .239 | .275 | .337 |
| .511 | .308 | .226 | .255 | .315 | .405 |
| .515 | .289 | .208 | .260 | .353 | .457 |
| .523 | .131 | .049 | .135 | .247 | .336 |
| .529 | -.407 | -.198 | -.231 | -.271 | -.304 |
| .538 | -.301 | -.174 | -.216 | -.256 | -.273 |
| .567 | -.189 | -.222 | -.255 | -.274 | -.269 |
| .602 | -.138 | -.132 | -.208 | -.256 | -.257 |
| .648 | -.064 | -.061 | -.076 | -.133 | -.167 |
| .711 | -.031 | -.035 | -.050 | -.082 | -.118 |
| .810 | -.005 | -.009 | -.031 | -.072 | -.101 |
| .894 | .151 | .158 | .167 | .178 | .177 |
| .970 | .094 | .112 | .094 | .070 | .072 |
| .976 | .048 | .062 | .046 | .033 | .038 |
| .982 | .002 | .013 | -.001 | -.010 | -.002 |
| .988 | -.029 | -.019 | -.035 | -.045 | -.032 |
| .996 | -.106 | -.095 | -.111 | -.127 | -.104 |

| x/l | C _p for - | | | | |
|-------|----------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.196 | 0.196 | 0.201 | 0.219 | 0.233 |
| .041 | .177 | .182 | .194 | .212 | .233 |
| .057 | .139 | .144 | .154 | .167 | .187 |
| .078 | .153 | .156 | .166 | .180 | .199 |
| .098 | .152 | .150 | .158 | .173 | .192 |
| .110 | .147 | .148 | .156 | .172 | .193 |
| .118 | -.294 | -.294 | -.289 | -.283 | -.272 |
| .130 | -.251 | -.252 | -.248 | -.239 | -.227 |
| .142 | -.204 | -.205 | -.203 | -.199 | -.188 |
| .155 | -.190 | -.177 | -.178 | -.171 | -.163 |
| .167 | -.135 | -.139 | -.142 | -.140 | -.138 |
| .179 | -.108 | -.114 | -.118 | -.123 | -.132 |
| .191 | -.080 | -.087 | -.093 | -.105 | -.105 |
| .224 | .261 | .261 | .267 | .278 | .296 |
| .232 | .287 | .288 | .301 | .328 | .363 |
| .248 | .331 | .332 | .350 | .376 | .406 |
| .264 | .321 | .321 | .331 | .342 | .360 |
| .280 | .289 | .290 | .300 | .305 | .322 |
| .297 | .263 | .265 | .276 | .286 | .303 |
| .321 | .130 | .143 | .169 | .192 | .208 |
| .329 | -.330 | -.328 | -.322 | -.316 | -.311 |
| .337 | -.289 | -.287 | -.298 | -.296 | -.293 |
| .365 | -.218 | -.216 | -.227 | -.230 | -.222 |
| .398 | -.175 | -.166 | -.173 | -.179 | -.173 |
| .442 | -.118 | -.118 | -.122 | -.125 | -.124 |
| .491 | .291 | .288 | .294 | .297 | .309 |
| .499 | .311 | .306 | .305 | .307 | .320 |
| .503 | .319 | .309 | .309 | .311 | .329 |
| .507 | .338 | .328 | .333 | .344 | .370 |
| .511 | .358 | .331 | .347 | .368 | .406 |
| .515 | .328 | .320 | .350 | .383 | .434 |
| .523 | .160 | .159 | .202 | .243 | .300 |
| .529 | -.316 | -.265 | -.245 | -.245 | -.251 |
| .538 | -.201 | -.193 | -.199 | -.207 | -.215 |
| .567 | -.210 | -.217 | -.234 | -.236 | -.233 |
| .602 | -.158 | -.159 | -.196 | -.220 | -.213 |
| .648 | -.063 | -.064 | -.067 | -.076 | -.077 |
| .711 | -.034 | -.038 | -.037 | -.050 | -.051 |
| .810 | -.015 | -.019 | -.023 | -.036 | -.037 |
| .894 | .152 | .154 | .169 | .193 | .212 |
| .970 | .140 | .159 | .148 | .145 | .154 |
| .976 | .092 | .100 | .097 | .104 | .117 |
| .982 | .040 | .044 | .047 | .058 | .071 |
| .988 | .009 | .014 | .015 | .022 | .038 |
| .996 | -.065 | -.058 | -.061 | -.059 | -.045 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS ON - Continued

(i) $M = 1.30; \alpha = 0^\circ$

(j) $M = 1.30; \alpha = 4^\circ$

| x/l | C_p for - | | | | | x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.253 | 0.246 | 0.247 | 0.256 | 0.262 | 0.025 | 0.296 | 0.292 | 0.271 | 0.241 | 0.221 |
| .041 | .239 | .233 | .234 | .241 | .242 | .041 | .301 | .295 | .276 | .243 | .226 |
| .057 | .191 | .192 | .197 | .193 | .191 | .057 | .264 | .259 | .238 | .211 | .187 |
| .078 | .211 | .209 | .213 | .208 | .209 | .078 | .276 | .270 | .250 | .227 | .201 |
| .098 | .201 | .197 | .200 | .202 | .207 | .098 | .265 | .258 | .240 | .212 | .188 |
| .110 | .203 | .196 | .199 | .201 | .203 | .110 | .268 | .259 | .241 | .215 | .190 |
| .118 | -.269 | -.271 | -.269 | -.269 | -.266 | .118 | -.240 | -.241 | -.251 | -.262 | -.275 |
| .130 | -.222 | -.225 | -.221 | -.221 | -.219 | .130 | -.188 | -.189 | -.203 | -.218 | -.230 |
| .142 | -.179 | -.180 | -.176 | -.180 | -.176 | .142 | -.145 | -.148 | -.163 | -.176 | -.191 |
| .155 | -.171 | -.158 | -.155 | -.149 | -.148 | .155 | -.149 | -.132 | -.142 | -.156 | -.165 |
| .167 | -.121 | -.123 | -.123 | -.118 | -.119 | .167 | -.099 | -.103 | -.112 | -.128 | -.139 |
| .179 | -.101 | -.104 | -.104 | -.101 | -.101 | .179 | -.087 | -.091 | -.098 | -.111 | -.132 |
| .191 | -.082 | -.085 | -.084 | -.086 | -.083 | .191 | -.071 | -.074 | -.084 | -.096 | -.105 |
| .224 | .303 | .299 | .299 | .301 | .301 | .224 | .328 | .320 | .311 | .298 | .294 |
| .232 | .370 | .362 | .361 | .360 | .361 | .232 | .459 | .448 | .420 | .386 | .361 |
| .248 | .407 | .404 | .406 | .403 | .406 | .248 | .477 | .472 | .452 | .424 | .401 |
| .264 | .373 | .372 | .376 | .366 | .370 | .264 | .423 | .417 | .399 | .377 | .357 |
| .280 | .338 | .336 | .340 | .331 | .332 | .280 | .385 | .378 | .360 | .337 | .315 |
| .297 | .313 | .310 | .313 | .310 | .310 | .297 | .369 | .360 | .341 | .315 | .294 |
| .321 | .203 | .203 | .204 | .207 | .208 | .321 | .261 | .261 | .243 | .224 | .200 |
| .329 | -.303 | -.308 | -.306 | -.307 | -.307 | .329 | -.282 | -.283 | -.290 | -.305 | -.314 |
| .337 | -.277 | -.281 | -.279 | -.281 | -.282 | .337 | -.254 | -.260 | -.267 | -.288 | -.298 |
| .365 | -.209 | -.205 | -.206 | -.211 | -.210 | .365 | -.175 | -.175 | -.184 | -.211 | -.230 |
| .398 | -.153 | -.153 | -.155 | -.159 | -.160 | .398 | -.121 | -.127 | -.135 | -.157 | -.172 |
| .442 | -.104 | -.106 | -.109 | -.112 | -.114 | .442 | -.088 | -.093 | -.107 | -.128 | -.134 |
| .491 | .339 | .334 | .338 | .330 | .332 | .491 | .379 | .369 | .349 | .320 | .300 |
| .499 | .362 | .358 | .361 | .354 | .356 | .499 | .400 | .387 | .365 | .333 | .307 |
| .503 | .372 | .367 | .371 | .363 | .364 | .503 | .412 | .400 | .376 | .344 | .313 |
| .507 | .413 | .408 | .412 | .401 | .402 | .507 | .485 | .469 | .439 | .398 | .358 |
| .511 | .441 | .432 | .436 | .425 | .425 | .511 | .552 | .532 | .498 | .448 | .396 |
| .515 | .453 | .444 | .447 | .437 | .436 | .515 | .597 | .575 | .537 | .485 | .426 |
| .523 | .299 | .292 | .294 | .281 | .279 | .523 | .441 | .429 | .399 | .349 | .299 |
| .529 | -.254 | -.259 | -.253 | -.253 | -.254 | .529 | -.270 | -.265 | -.262 | -.262 | -.247 |
| .538 | -.204 | -.202 | -.202 | -.200 | -.200 | .538 | -.216 | -.215 | -.219 | -.223 | -.216 |
| .567 | -.222 | -.219 | -.223 | -.223 | -.220 | .567 | -.209 | -.211 | -.217 | -.229 | -.235 |
| .602 | -.192 | -.187 | -.190 | -.194 | -.188 | .602 | -.186 | -.191 | -.195 | -.204 | -.217 |
| .648 | -.054 | -.054 | -.052 | -.053 | -.051 | .648 | -.035 | -.037 | -.056 | -.080 | -.091 |
| .711 | -.031 | -.034 | -.034 | -.032 | -.034 | .711 | -.030 | -.037 | -.052 | -.058 | -.060 |
| .810 | -.019 | -.021 | -.017 | -.025 | -.020 | .810 | -.017 | -.023 | -.034 | -.047 | -.046 |
| .894 | .197 | .188 | .188 | .187 | .188 | .894 | .240 | .221 | .212 | .191 | .178 |
| .970 | .268 | .263 | .275 | .267 | .266 | .970 | .337 | .328 | .318 | .242 | .207 |
| .976 | .214 | .206 | .219 | .213 | .210 | .976 | .284 | .279 | .272 | .210 | .174 |
| .982 | .145 | .137 | .147 | .146 | .141 | .982 | .208 | .208 | .206 | .160 | .127 |
| .988 | .103 | .094 | .104 | .104 | .102 | .988 | .163 | .164 | .161 | .123 | .096 |
| .996 | .014 | .008 | .014 | .017 | .016 | .996 | .069 | .069 | .068 | .038 | .015 |

TABLE IV.- PRESSURE COEFFICIENTS FOR SATURN MODEL
WITH SEAL STRIPS ON - Concluded

(k) $M = 1.30$; $\alpha = 8^\circ$

| x/l | C_p for - | | | | |
|-------|------------------|---------------------|-------------------|---------------------|-------------------|
| | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| 0.025 | 0.373 | 0.366 | 0.302 | 0.235 | 0.182 |
| .041 | .382 | .361 | .306 | .257 | .202 |
| .057 | .339 | .315 | .258 | .209 | .154 |
| .078 | .348 | .326 | .280 | .223 | .167 |
| .098 | .335 | .315 | .270 | .206 | .153 |
| .110 | .343 | .320 | .274 | .212 | .157 |
| .118 | -.205 | -.214 | -.239 | -.269 | -.297 |
| .130 | -.137 | -.150 | -.184 | -.225 | -.258 |
| .142 | -.091 | -.107 | -.140 | -.185 | -.222 |
| .155 | -.102 | -.092 | -.127 | -.162 | -.200 |
| .167 | -.056 | -.069 | -.104 | -.147 | -.179 |
| .179 | -.047 | -.061 | -.097 | -.140 | -.167 |
| .191 | -.032 | -.050 | -.090 | -.132 | -.154 |
| .224 | .328 | .305 | .278 | .260 | .253 |
| .232 | .538 | .528 | .455 | .395 | .335 |
| .248 | .518 | .497 | .455 | .402 | .359 |
| .264 | .483 | .463 | .416 | .349 | .304 |
| .280 | .462 | .440 | .394 | .327 | .277 |
| .297 | .452 | .429 | .381 | .319 | .267 |
| .321 | .323 | .311 | .267 | .220 | .175 |
| .329 | -.259 | -.268 | -.288 | -.310 | -.332 |
| .337 | -.223 | -.239 | -.264 | -.296 | -.316 |
| .365 | -.125 | -.137 | -.171 | -.213 | -.245 |
| .398 | -.076 | -.091 | -.124 | -.171 | -.201 |
| .442 | -.047 | -.061 | -.095 | -.140 | -.175 |
| .491 | .442 | .415 | .360 | .299 | .252 |
| .499 | .462 | .432 | .373 | .306 | .253 |
| .503 | .481 | .451 | .391 | .320 | .265 |
| .507 | .596 | .561 | .491 | .404 | .333 |
| .511 | .704 | .661 | .588 | .486 | .402 |
| .515 | .754 | .715 | .645 | .549 | .456 |
| .523 | .537 | .511 | .464 | .397 | .332 |
| .529 | -.303 | -.309 | -.318 | -.324 | -.314 |
| .538 | -.228 | -.237 | -.256 | -.276 | -.282 |
| .567 | -.183 | -.196 | -.224 | -.254 | -.271 |
| .602 | -.167 | -.173 | -.194 | -.230 | -.254 |
| .648 | .009 | -.020 | -.098 | -.171 | -.175 |
| .711 | -.014 | -.037 | -.086 | -.135 | -.137 |
| .810 | -.011 | -.031 | -.071 | -.122 | -.120 |
| .894 | .274 | .218 | .176 | .102 | .084 |
| .970 | .345 | .379 | .339 | .274 | .187 |
| .976 | .303 | .333 | .296 | .240 | .162 |
| .982 | .237 | .259 | .236 | .191 | .119 |
| .988 | .199 | .211 | .197 | .156 | .090 |
| .996 | .106 | .114 | .104 | .070 | .012 |

TABLE V. - PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF

(a) $M = 1.20; \alpha = -8^\circ$

| x/l | $\theta,$ deg | C _{p,t} for - | | | | C _{p,t} for - | | | |
|-------|------------------|------------------------|---------------------|-------------------|---------------------|------------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.128 | 0.122 | 0.122 | 0.116 | 0.092 | 0.089 | -0.087 | -0.111 |
| | .30 | .103 | .073 | .057 | .065 | .049 | .089 | -.080 | -.106 |
| | .45 | .117 | .073 | .045 | .050 | .045 | .082 | -.082 | -.101 |
| | .60 | .130 | .082 | .050 | .054 | .045 | .083 | -.079 | -.119 |
| | .75 | .169 | .045 | .026 | .026 | .026 | .053 | -.094 | -.118 |
| | .90 | .048 | .045 | .042 | .042 | .045 | .053 | -.094 | -.118 |
| | 1.05 | .044 | .052 | .049 | .049 | .045 | .050 | -.094 | -.118 |
| | 1.35 | .054 | .054 | .048 | .048 | .046 | .054 | -.094 | -.118 |
| | 1.50 | .057 | .054 | .048 | .048 | .043 | .059 | -.094 | -.118 |
| | 1.80 | .057 | .050 | .044 | .044 | .044 | .050 | -.094 | -.118 |
| | 2.10 | .057 | .050 | .044 | .044 | .044 | .050 | -.094 | -.118 |
| | 2.25 | .056 | .051 | .051 | .052 | .041 | .051 | -.094 | -.118 |
| | 24.0 | .059 | .051 | .042 | .042 | .042 | .042 | -.094 | -.118 |
| | 27.0 | .242 | .049 | .037 | .037 | .037 | .044 | -.094 | -.118 |
| | 300 | .228 | .170 | .186 | .135 | .151 | .151 | -.094 | -.118 |
| | 315 | .185 | .153 | .140 | .145 | .118 | .140 | -.094 | -.118 |
| | 350 | .021 | .021 | .021 | .021 | .082 | .082 | -.094 | -.118 |
| .709 | 0 | .023 | .022 | .019 | .022 | .022 | .029 | -.094 | -.118 |
| | .30 | .020 | .027 | .027 | .027 | .027 | .027 | -.094 | -.118 |
| | .45 | .007 | .022 | .022 | .022 | .022 | .022 | -.094 | -.118 |
| | .60 | .014 | .002 | .013 | .013 | .013 | .003 | -.094 | -.118 |
| | .75 | .020 | .024 | .024 | .024 | .024 | .002 | -.094 | -.118 |
| | .90 | .021 | .023 | .023 | .023 | .023 | .002 | -.094 | -.118 |
| | 1.05 | .045 | .028 | .028 | .028 | .028 | .002 | -.094 | -.118 |
| | 1.35 | .021 | .043 | .043 | .043 | .043 | .019 | -.094 | -.118 |
| | 1.50 | .021 | .023 | .023 | .023 | .023 | .017 | -.094 | -.118 |
| | 1.80 | .023 | .023 | .023 | .023 | .023 | .019 | -.094 | -.118 |
| | 2.10 | .022 | .027 | .027 | .020 | .022 | .018 | -.094 | -.118 |
| | 2.25 | .020 | .024 | .024 | .018 | .023 | .016 | -.094 | -.118 |
| | 24.0 | .016 | .021 | .017 | .023 | .017 | .010 | -.094 | -.118 |
| | 27.0 | .020 | .026 | .011 | .012 | .012 | .049 | -.094 | -.118 |
| | 300 | .027 | .025 | .025 | .004 | .006 | .043 | -.094 | -.118 |
| | 315 | .020 | .023 | .002 | .002 | .002 | .024 | -.094 | -.118 |
| | 350 | .030 | .020 | .007 | .001 | .001 | .020 | -.094 | -.118 |
| .428 | 0 | .050 | .056 | .063 | .092 | .092 | .136 | .020 | 0 |
| | .30 | .019 | .029 | .053 | .078 | .078 | .106 | .050 | .30 |
| | .45 | .030 | .016 | .030 | .039 | .039 | .057 | .045 | .45 |
| | .60 | .037 | .045 | .031 | .049 | .049 | .023 | .050 | .60 |
| | .75 | .045 | .045 | .070 | .055 | .055 | .060 | .050 | .70 |
| | .90 | .090 | .055 | .072 | .093 | .084 | .102 | .102 | .90 |
| | 1.05 | .072 | .068 | .076 | .071 | .071 | .075 | .075 | .100 |
| | 1.35 | .068 | .066 | .070 | .068 | .068 | .069 | .073 | .135 |
| | 1.50 | .066 | .068 | .067 | .067 | .067 | .069 | .073 | .150 |
| | 1.80 | .065 | .068 | .067 | .067 | .067 | .069 | .073 | .180 |
| | 2.10 | .063 | .062 | .064 | .062 | .062 | .062 | .070 | .210 |
| | 2.25 | .070 | .075 | .074 | .074 | .074 | .087 | .073 | .225 |
| | 24.0 | .075 | .074 | .074 | .074 | .074 | .072 | .072 | .240 |
| | 27.0 | .052 | .050 | .056 | .056 | .056 | .068 | .057 | .270 |
| | 300 | .028 | .023 | .032 | .032 | .032 | .068 | .089 | .300 |
| | 315 | .024 | .035 | .035 | .055 | .056 | .068 | .084 | .315 |
| | 350 | .030 | .034 | .056 | .056 | .056 | .070 | .093 | .350 |

TABLE V. - PRESSURE COEFFICIENTS FOR SATURN MODEL TANK

WITH SEAL STRIPS OFF - Continued

(b) $M = 1.20; \alpha = -40^\circ$

| x/l | θ, deg | $C_{p,t} \text{ for } \phi = 0^\circ$ | | | $C_{p,t} \text{ for } \phi = 45^\circ$ | | | $C_{p,t} \text{ for } \phi = 67.5^\circ$ | | | $C_{p,t} \text{ for } \phi = 90^\circ$ | | |
|-------|----------------------|---------------------------------------|---------------------|-------------------|--|-------------------|------------------|--|-------------------|---------------------|--|--------|--|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | |
| 0.947 | 0 | 0.137 | 0.143 | 0.147 | 0.156 | 0.173 | 0.117 | 0.099 | -0.087 | -0.095 | -0.114 | -0.122 | |
| | .115 | .119 | .126 | .124 | .135 | .152 | .117 | .088 | -.086 | -.089 | -.093 | -.100 | |
| | .126 | .130 | .135 | .126 | .150 | .152 | .081 | .082 | -.080 | -.084 | -.088 | -.083 | |
| | .135 | .132 | .135 | .123 | .119 | .150 | .081 | .092 | -.103 | -.105 | -.090 | -.080 | |
| | .159 | .148 | .154 | .134 | .126 | .160 | .092 | .105 | -.195 | -.195 | -.116 | -.100 | |
| | .120 | .005 | .013 | .018 | .022 | .015 | .059 | .120 | -.197 | -.167 | -.193 | -.199 | |
| | .135 | .039 | .038 | .037 | .039 | .055 | .059 | .135 | -.167 | -.167 | -.168 | -.171 | |
| | .150 | .039 | .040 | .040 | .041 | .059 | .041 | .150 | -.166 | -.166 | -.168 | -.167 | |
| | .180 | .044 | .042 | .040 | .041 | .059 | .041 | .180 | -.164 | -.164 | -.168 | -.164 | |
| | .210 | .045 | .044 | .042 | .040 | .057 | .040 | .210 | -.169 | -.169 | -.170 | -.170 | |
| | .225 | .045 | .042 | .039 | .038 | .057 | .040 | .225 | -.174 | -.174 | -.176 | -.172 | |
| | .240 | .055 | .043 | .041 | .040 | .059 | .040 | .240 | -.188 | -.186 | -.190 | -.184 | |
| | .270 | .054 | .047 | .067 | .071 | .066 | .067 | .270 | -.102 | -.094 | -.092 | -.108 | |
| | .300 | .221 | .203 | .188 | .184 | .185 | .184 | .300 | -.096 | -.089 | -.104 | -.124 | |
| | .315 | .175 | .155 | .149 | .149 | .160 | .158 | .315 | -.090 | -.091 | -.103 | -.118 | |
| | .330 | .176 | .158 | .154 | .158 | .172 | .172 | .330 | -.090 | -.091 | -.099 | -.116 | |
| .709 | 0 | .006 | .002 | -.003 | -.014 | -.023 | -.016 | .119 | 0 | .205 | .210 | .242 | |
| | .006 | .009 | .007 | .000 | -.010 | -.004 | -.001 | .001 | .30 | -.197 | .209 | .244 | |
| | .014 | .014 | .014 | .014 | .014 | .014 | .014 | .45 | -.202 | .202 | .218 | .215 | |
| | .005 | .008 | .005 | .000 | -.002 | -.005 | -.003 | .005 | .60 | -.219 | .219 | .253 | |
| | .014 | .014 | .014 | .014 | .014 | .013 | .013 | .90 | -.226 | .251 | .261 | .259 | |
| | .020 | .019 | .020 | .019 | .018 | .019 | .019 | .120 | -.232 | .231 | .233 | .232 | |
| | .022 | .020 | .022 | .020 | .018 | .019 | .019 | .135 | -.211 | .211 | .213 | .210 | |
| | .047 | .047 | .047 | .047 | .085 | .086 | .086 | .150 | -.224 | .223 | .225 | .224 | |
| | .020 | .022 | .020 | .018 | .018 | .018 | .018 | .180 | -.218 | .214 | .217 | .217 | |
| | .022 | .021 | .020 | .019 | .019 | .019 | .019 | .210 | -.224 | .224 | .226 | .222 | |
| | .021 | .020 | .019 | .019 | .017 | .017 | .017 | .225 | -.221 | .221 | .222 | .221 | |
| | .020 | .019 | .019 | .017 | .018 | .014 | .014 | .240 | -.229 | .232 | .232 | .229 | |
| | .012 | .013 | .012 | .009 | .010 | .005 | .005 | .270 | -.231 | .212 | .224 | .220 | |
| | .010 | .008 | .008 | -.002 | -.005 | -.005 | -.005 | .300 | -.226 | .210 | .230 | .225 | |
| | .011 | .004 | .004 | .001 | -.002 | -.002 | -.006 | .315 | -.212 | .206 | .227 | .221 | |
| | .004 | .001 | .001 | .001 | -.004 | -.006 | -.012 | .330 | -.204 | .195 | .226 | .217 | |
| .428 | 0 | -.033 | -.042 | -.052 | -.065 | -.065 | -.065 | .020 | 0 | .225 | .238 | .255 | |
| | -.033 | -.033 | -.038 | -.045 | -.053 | -.053 | -.053 | .030 | .30 | -.246 | .253 | .262 | |
| | -.025 | -.028 | -.028 | -.030 | -.033 | -.032 | -.032 | .45 | -.250 | .250 | .258 | .257 | |
| | .60 | .034 | .037 | .035 | .032 | .032 | .032 | .60 | -.259 | .261 | .262 | .258 | |
| | .90 | .059 | .044 | .046 | .048 | .048 | .048 | .90 | -.258 | .262 | .264 | .262 | |
| | .120 | .083 | .085 | .086 | .089 | .089 | .089 | .120 | -.243 | .244 | .243 | .241 | |
| | .135 | .069 | .070 | .070 | .073 | .074 | .074 | .135 | -.210 | .139 | .201 | .204 | |
| | .150 | .064 | .064 | .066 | .067 | .068 | .067 | .150 | -.206 | .206 | .199 | .198 | |
| | .180 | .061 | .062 | .062 | .064 | .065 | .063 | .180 | -.212 | .212 | .208 | .207 | |
| | .210 | .057 | .057 | .057 | .058 | .059 | .057 | .210 | -.211 | .211 | .212 | .207 | |
| | .225 | .084 | .084 | .084 | .086 | .086 | .084 | .225 | -.211 | .211 | .212 | .202 | |
| | .240 | .071 | .069 | .069 | .071 | .070 | .070 | .240 | -.226 | .227 | .227 | .221 | |
| | .270 | .033 | .034 | .034 | .039 | .043 | .043 | .270 | -.259 | .261 | .258 | .266 | |
| | .300 | .027 | .027 | .027 | .035 | .040 | .040 | .300 | -.259 | .261 | .256 | .255 | |
| | .315 | .057 | .057 | .057 | .060 | .061 | .061 | .315 | -.255 | .261 | .256 | .255 | |
| | .330 | .030 | .040 | .040 | .049 | .049 | .049 | .330 | -.246 | .251 | .251 | .253 | |

TABLE V. - PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF - Continued

(c) $M = 1.20; \alpha = 0^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | | $C_{p,t}$ for - | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|-------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.190 | 0.185 | 0.178 | 0.175 | 0.175 | 0.250 | 0 | -0.094 |
| 30 | .167 | .159 | .152 | .151 | .150 | .150 | .095 | -0.094 | -0.088 |
| 45 | .173 | .165 | .158 | .158 | .159 | .159 | .097 | -0.092 | -0.084 |
| 60 | .178 | .171 | .165 | .164 | .166 | .166 | .094 | -0.092 | -0.085 |
| 90 | .205 | .197 | .190 | .191 | .192 | .192 | .090 | -0.096 | -0.089 |
| 120 | .007 | .009 | .006 | .008 | .007 | .007 | .090 | -0.090 | -0.087 |
| 135 | .034 | .032 | .030 | .033 | .031 | .031 | .094 | -0.094 | -0.085 |
| 150 | .035 | .033 | .032 | .033 | .035 | .035 | .096 | -0.096 | -0.084 |
| 180 | .040 | .036 | .036 | .037 | .037 | .037 | .097 | -0.097 | -0.084 |
| 210 | .041 | .037 | .036 | .038 | .038 | .038 | .098 | -0.098 | -0.084 |
| 225 | .041 | .036 | .036 | .037 | .037 | .037 | .098 | -0.098 | -0.084 |
| 240 | .041 | .037 | .035 | .037 | .038 | .038 | .098 | -0.098 | -0.084 |
| 270 | .058 | .043 | .043 | .044 | .044 | .044 | .098 | -0.098 | -0.084 |
| 300 | .266 | .261 | .253 | .249 | .243 | .243 | .098 | -0.098 | -0.084 |
| 315 | .234 | .226 | .219 | .214 | .210 | .210 | .098 | -0.098 | -0.084 |
| 330 | .220 | .212 | .206 | .202 | .199 | .199 | .095 | -0.095 | -0.089 |
| .709 | 0 | .008 | .009 | .008 | .008 | .008 | .119 | 0 | .009 |
| 30 | -.004 | -.005 | -.005 | -.004 | -.004 | -.004 | .220 | .221 | .221 |
| 45 | 0.000 | -.002 | -.001 | -.001 | 0.000 | 0.000 | .219 | .219 | .219 |
| 60 | -.004 | -.006 | -.006 | -.005 | -.005 | -.005 | .217 | .217 | .217 |
| 90 | .007 | .005 | .005 | .006 | .006 | .006 | .228 | .228 | .228 |
| 120 | .014 | .011 | .011 | .012 | .013 | .013 | .230 | .230 | .230 |
| 135 | .016 | .013 | .013 | .014 | .014 | .014 | .241 | .241 | .241 |
| 150 | .043 | .025 | .017 | .017 | .016 | .016 | .240 | .240 | .241 |
| 180 | .016 | .014 | .013 | .014 | .014 | .014 | .241 | .241 | .241 |
| 210 | .017 | .014 | .014 | .015 | .015 | .015 | .241 | .241 | .241 |
| 225 | .016 | .013 | .013 | .013 | .013 | .013 | .226 | .226 | .226 |
| 240 | .014 | .012 | .012 | .013 | .013 | .013 | .205 | .205 | .205 |
| 270 | .005 | .003 | .003 | .005 | .005 | .005 | .207 | .207 | .207 |
| 300 | -.004 | -.004 | -.003 | -.001 | -.002 | -.001 | .220 | .220 | .220 |
| 315 | -.004 | -.004 | -.003 | -.002 | -.001 | -.001 | .210 | .210 | .210 |
| 330 | -.011 | -.011 | -.011 | -.009 | -.009 | -.009 | .217 | .217 | .217 |
| .428 | 0 | -.034 | -.039 | -.036 | -.043 | -.043 | .020 | 0 | .235 |
| 30 | -.035 | -.037 | -.036 | -.038 | -.040 | -.040 | .250 | .250 | .250 |
| 45 | -.025 | -.030 | -.029 | -.021 | -.021 | -.021 | .247 | .247 | .247 |
| 60 | -.035 | -.038 | -.038 | -.040 | -.041 | -.041 | .251 | .251 | .251 |
| 90 | -.032 | -.036 | -.036 | -.038 | -.039 | -.039 | .254 | .254 | .254 |
| 120 | -.084 | -.085 | -.085 | -.085 | -.085 | -.085 | .256 | .256 | .256 |
| 135 | -.068 | -.071 | -.069 | -.071 | -.070 | -.070 | .237 | .237 | .237 |
| 150 | -.064 | -.066 | -.066 | -.065 | -.064 | -.064 | .198 | .198 | .198 |
| 180 | -.061 | -.063 | -.063 | -.065 | -.062 | -.062 | .195 | .195 | .195 |
| 210 | -.056 | -.058 | -.058 | -.058 | -.056 | -.056 | .203 | .203 | .203 |
| 225 | -.079 | -.082 | -.081 | -.081 | -.082 | -.082 | .201 | .201 | .201 |
| 240 | -.067 | -.069 | -.071 | -.068 | -.068 | -.068 | .200 | .200 | .200 |
| 270 | -.029 | -.034 | -.034 | -.036 | -.036 | -.036 | .218 | .218 | .218 |
| 300 | -.029 | -.034 | -.035 | -.036 | -.036 | -.036 | .255 | .255 | .255 |
| 315 | -.029 | -.034 | -.035 | -.036 | -.036 | -.036 | .252 | .252 | .252 |
| 330 | -.032 | -.038 | -.036 | -.036 | -.039 | -.039 | .250 | .250 | .250 |

TABLE V.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF - Continued

(a) $M = 1.20; \alpha = 4^\circ$

| x/l | θ , deg | C _{p,t} for - | | | $\phi = 0^\circ$ | $\phi = 45^\circ$ | $\phi = 90^\circ$ | C _{p,t} for - | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
|-------|-------------------|------------------------|-------------------|---------------------|------------------|-------------------|-------------------|------------------------|-------------------|---------------------|-------------------|
| | | x/l | θ , deg | $\phi = 22.5^\circ$ | | | | | | | |
| 0.947 | 0 | 0.251 | 0.28 | 0.204 | 0.181 | 0.152 | 0.116 | -0.069 | -0.094 | -0.096 | -0.116 |
| | .211 | .185 | .156 | .142 | .117 | .058 | .074 | -.074 | -.099 | -.097 | -.117 |
| | .45 | .187 | .146 | .144 | .110 | .068 | .082 | -.072 | -.097 | -.102 | -.117 |
| | .60 | .182 | .146 | .137 | .110 | .060 | .082 | -.074 | -.097 | -.102 | -.121 |
| | .90 | .227 | .188 | .162 | .132 | .090 | .074 | -.081 | -.095 | -.098 | -.105 |
| | 1.20 | .000 | .099 | .013 | .010 | .017 | .120 | -.194 | -.197 | -.195 | -.195 |
| | 1.35 | .035 | .037 | .034 | .035 | .040 | .135 | -.162 | -.166 | -.164 | -.171 |
| | 1.50 | .035 | .039 | .037 | .036 | .036 | .150 | -.161 | -.165 | -.164 | -.167 |
| | 1.80 | .041 | .042 | .038 | .037 | .038 | .180 | -.158 | -.162 | -.162 | -.165 |
| | 2.10 | .042 | .042 | .040 | .041 | .041 | .210 | -.168 | -.168 | -.167 | -.171 |
| | 2.25 | .041 | .043 | .039 | .039 | .039 | .225 | -.169 | -.170 | -.170 | -.174 |
| | 2.40 | .041 | .042 | .039 | .037 | .040 | .240 | -.188 | -.183 | -.185 | -.188 |
| | 2.70 | .049 | .047 | .051 | .053 | .043 | .270 | -.078 | -.076 | -.080 | -.090 |
| | 3.00 | .253 | .253 | .324 | .296 | .269 | .300 | -.075 | -.068 | -.071 | -.084 |
| | 3.15 | .292 | .285 | .283 | .263 | .245 | .315 | -.071 | -.068 | -.070 | -.079 |
| | 3.30 | .284 | .271 | .258 | .235 | .212 | .330 | -.070 | -.072 | -.078 | -.092 |
| | .709 | 0 | -.009 | -.014 | -.020 | -.021 | 0 | -.201 | -.206 | -.217 | -.235 |
| | | -.003 | -.009 | -.014 | -.006 | -.004 | .30 | -.222 | -.222 | -.237 | -.245 |
| | | .45 | -.002 | -.007 | -.002 | -.003 | .45 | -.219 | -.234 | -.242 | -.252 |
| | | .60 | -.010 | -.013 | -.012 | -.007 | .60 | -.232 | -.245 | -.256 | -.268 |
| | | .90 | -.002 | -.003 | -.002 | -.009 | .90 | -.231 | -.242 | -.252 | -.252 |
| | | 1.20 | -.013 | -.014 | -.010 | -.015 | .120 | -.225 | -.228 | -.230 | -.230 |
| | | 1.35 | -.014 | -.014 | -.014 | -.014 | .135 | -.205 | -.209 | -.210 | -.214 |
| | | 1.50 | -.013 | -.015 | -.015 | -.016 | .150 | -.218 | -.220 | -.223 | -.224 |
| | | 1.80 | -.016 | -.017 | -.015 | -.014 | .180 | -.213 | -.212 | -.214 | -.217 |
| | | 2.10 | -.015 | -.017 | -.013 | -.016 | .210 | -.219 | -.220 | -.223 | -.225 |
| | | 2.25 | -.014 | -.013 | -.013 | -.015 | .225 | -.216 | -.219 | -.222 | -.221 |
| | | 2.40 | -.013 | -.013 | -.012 | -.015 | .240 | -.226 | -.227 | -.229 | -.228 |
| | | 2.70 | -.001 | -.001 | -.001 | -.002 | .270 | -.228 | -.230 | -.238 | -.244 |
| | | 3.00 | -.006 | -.005 | -.006 | -.006 | .300 | -.233 | -.238 | -.244 | -.255 |
| | | 3.15 | -.004 | -.002 | -.008 | -.007 | .315 | -.220 | -.222 | -.225 | -.236 |
| | | 3.30 | -.010 | -.013 | -.020 | -.018 | .330 | -.208 | -.185 | -.199 | -.220 |
| | .428 | 0 | -.037 | -.043 | -.056 | -.057 | 0 | -.228 | -.232 | -.240 | -.257 |
| | | .30 | -.034 | -.042 | -.052 | -.050 | .30 | -.250 | -.253 | -.258 | -.263 |
| | | .45 | -.028 | -.043 | -.042 | -.050 | .45 | -.243 | -.252 | -.256 | -.261 |
| | | .60 | -.039 | -.047 | -.055 | -.053 | .60 | -.255 | -.255 | -.259 | -.264 |
| | | .90 | -.033 | -.037 | -.042 | -.041 | .90 | -.255 | -.259 | -.263 | -.264 |
| | | 1.20 | -.085 | -.089 | -.088 | -.087 | .088 | -.238 | -.241 | -.245 | -.246 |
| | | 1.35 | -.068 | -.071 | -.070 | -.074 | .135 | -.206 | -.239 | -.245 | -.250 |
| | | 1.50 | -.063 | -.065 | -.066 | -.069 | .150 | -.202 | -.202 | -.205 | -.202 |
| | | 1.80 | -.060 | -.063 | -.064 | -.065 | .180 | -.209 | -.210 | -.212 | -.210 |
| | | 2.10 | -.057 | -.061 | -.060 | -.060 | .210 | -.207 | -.210 | -.212 | -.207 |
| | | 2.25 | -.081 | -.081 | -.086 | -.081 | .225 | -.211 | -.211 | -.216 | -.206 |
| | | 2.40 | -.067 | -.068 | -.071 | -.069 | .240 | -.221 | -.224 | -.226 | -.221 |
| | | 2.70 | -.035 | -.035 | -.038 | -.039 | .270 | -.254 | -.256 | -.257 | -.258 |
| | | 3.00 | -.040 | -.040 | -.046 | -.047 | .300 | -.251 | -.258 | -.256 | -.256 |
| | | 3.15 | -.036 | -.037 | -.042 | -.043 | .315 | -.250 | -.254 | -.253 | -.253 |
| | | 3.30 | -.038 | -.037 | -.046 | -.047 | .330 | -.249 | -.252 | -.252 | -.257 |

| x/l | θ , deg | C _{p,t} for - | | | $\phi = 0^\circ$ | $\phi = 45^\circ$ | $\phi = 90^\circ$ | C _{p,t} for - | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
|-------|-------------------|------------------------|-------------------|---------------------|------------------|-------------------|-------------------|------------------------|-------------------|---------------------|-------------------|
| | | x/l | θ , deg | $\phi = 22.5^\circ$ | | | | | | | |
| 0.947 | 0 | 0.251 | 0.28 | 0.204 | 0.181 | 0.152 | 0.116 | -0.069 | -0.079 | -0.086 | -0.096 |
| | .211 | .185 | .156 | .142 | .117 | .058 | .074 | -.074 | -.097 | -.102 | -.117 |
| | .45 | .187 | .146 | .137 | .110 | .060 | .082 | -.082 | -.097 | -.102 | -.121 |
| | .60 | .182 | .146 | .132 | .109 | .068 | .081 | -.081 | -.095 | -.102 | -.115 |
| | .90 | .227 | .188 | .161 | .132 | .090 | .074 | -.074 | -.095 | -.102 | -.117 |
| | 1.20 | .000 | .099 | .013 | .010 | .017 | .120 | -.194 | -.197 | -.195 | -.195 |
| | 1.35 | .035 | .037 | .034 | .035 | .035 | .135 | -.162 | -.165 | -.164 | -.171 |
| | 1.50 | .035 | .039 | .037 | .036 | .036 | .150 | -.165 | -.162 | -.162 | -.167 |
| | 1.80 | .041 | .042 | .040 | .041 | .041 | .180 | -.158 | -.162 | -.162 | -.165 |
| | 2.10 | .042 | .042 | .040 | .041 | .041 | .210 | -.168 | -.168 | -.167 | -.171 |
| | 2.25 | .041 | .043 | .040 | .041 | .041 | .225 | -.169 | -.170 | -.170 | -.174 |
| | 2.40 | .041 | .042 | .037 | .040 | .040 | .240 | -.188 | -.183 | -.185 | -.188 |
| | 2.70 | .049 | .047 | .040 | .043 | .043 | .270 | -.078 | -.076 | -.080 | -.102 |
| | 3.00 | .050 | .051 | .042 | .047 | .047 | .300 | -.075 | -.071 | -.073 | -.092 |
| | 3.15 | .050 | .052 | .043 | .048 | .048 | .315 | -.071 | -.068 | -.070 | -.092 |
| | 3.30 | .050 | .052 | .046 | .047 | .047 | .330 | -.070 | -.072 | -.078 | -.092 |

TABLE V.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF - Continued

(e) $M = 1.20; \alpha = 8^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | | x/l | $\theta,$ deg | $C_{p,t}$ for - | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|-------|------------------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| .947 | 0 | .317 | .263 | .178 | .128 | 0.250 | 0 | -0.009 | -0.050 | -0.110 | -0.193 |
| 30 | .269 | .202 | .111 | .093 | .029 | 30 | -.020 | -.007 | -.139 | -.142 | -.174 |
| 45 | .273 | .208 | .110 | .087 | .023 | 45 | -.019 | -.057 | -.112 | -.131 | -.163 |
| 60 | .272 | .204 | .092 | .073 | .012 | 60 | -.015 | -.049 | -.110 | -.141 | -.172 |
| 90 | .306 | .208 | .086 | .085 | .018 | 90 | -.022 | -.041 | -.092 | -.119 | -.145 |
| 120 | -.022 | .013 | .029 | .028 | .038 | 120 | -.221 | -.227 | -.224 | -.199 | -.205 |
| 135 | .048 | .040 | .043 | .037 | .042 | 135 | -.180 | -.183 | -.186 | -.174 | -.189 |
| 150 | .042 | .040 | .043 | .037 | .042 | 150 | -.180 | -.182 | -.186 | -.173 | -.181 |
| 180 | .051 | .044 | .040 | .035 | .039 | 180 | -.172 | -.175 | -.173 | -.182 | -.182 |
| 210 | .051 | .048 | .045 | .043 | .045 | 210 | -.184 | -.183 | -.187 | -.178 | -.185 |
| 225 | .051 | .049 | .046 | .041 | .044 | 225 | -.190 | -.187 | -.194 | -.181 | -.188 |
| 240 | .052 | .049 | .048 | .043 | .045 | 240 | -.220 | -.204 | -.218 | -.199 | -.203 |
| 270 | .057 | .053 | .055 | .051 | .046 | 270 | -.029 | -.059 | -.073 | -.102 | -.102 |
| 300 | .399 | .405 | .400 | .311 | .209 | 300 | -.030 | -.022 | -.024 | -.050 | -.050 |
| 315 | .372 | .362 | .349 | .269 | .177 | 315 | -.023 | -.024 | -.035 | -.075 | -.075 |
| 350 | .354 | .333 | .288 | .217 | .122 | 350 | -.017 | -.032 | -.064 | -.117 | -.117 |
| | | | | | .119 | 0 | -.176 | -.184 | -.214 | -.280 | -.280 |
| .709 | 0 | .002 | .020 | .057 | .048 | -.047 | -.022 | .30 | -.190 | -.233 | -.265 |
| 30 | .005 | .019 | .029 | .013 | .013 | -.010 | -.006 | .45 | -.197 | -.215 | -.268 |
| 45 | .008 | .009 | .010 | .011 | .011 | -.011 | -.012 | .60 | -.204 | -.218 | -.285 |
| 60 | -.001 | .001 | .001 | .001 | .001 | -.002 | -.003 | .90 | -.192 | -.238 | -.278 |
| 90 | .010 | .010 | .012 | .008 | .008 | -.002 | -.003 | .120 | -.255 | -.247 | -.290 |
| 120 | .016 | .016 | .013 | .011 | .011 | -.012 | -.013 | .135 | -.220 | -.221 | -.258 |
| 135 | .016 | .016 | .014 | .013 | .013 | -.012 | -.015 | .150 | -.238 | -.237 | -.250 |
| 150 | .016 | .013 | .013 | .013 | .013 | -.011 | -.012 | .180 | -.231 | -.228 | -.259 |
| 180 | .017 | .013 | .013 | .010 | .010 | -.012 | -.012 | .210 | -.239 | -.240 | -.274 |
| 210 | .015 | .014 | .014 | .014 | .016 | -.015 | -.016 | .225 | -.237 | -.236 | -.272 |
| 225 | .014 | .012 | .013 | .012 | .012 | -.012 | -.013 | .240 | -.261 | -.259 | -.291 |
| 240 | .011 | .010 | .011 | .011 | .012 | -.004 | -.004 | .270 | -.192 | -.177 | -.246 |
| 270 | .008 | .007 | .005 | .005 | .000 | -.005 | -.004 | .300 | -.201 | -.177 | -.285 |
| 300 | .001 | .004 | .004 | .005 | .000 | -.006 | -.005 | .315 | -.195 | -.153 | -.281 |
| 315 | .003 | .005 | .006 | .006 | .005 | -.006 | -.007 | .350 | -.188 | -.143 | -.260 |
| 350 | -.004 | -.004 | -.009 | -.009 | -.009 | -.004 | -.005 | | | -.150 | -.202 |
| | | | | | | .020 | 0 | -.219 | -.228 | -.251 | -.286 |
| .428 | 0 | -.019 | -.39 | -.093 | -.105 | -.141 | -.093 | .30 | -.263 | -.268 | -.278 |
| 30 | -.019 | -.051 | -.051 | -.093 | -.085 | -.062 | -.079 | .45 | -.266 | -.270 | -.275 |
| 45 | -.011 | -.037 | -.037 | -.061 | -.062 | -.072 | -.068 | .60 | -.278 | -.279 | -.289 |
| 60 | -.024 | -.042 | -.065 | -.046 | -.038 | -.059 | -.059 | .90 | -.274 | -.277 | -.287 |
| 90 | -.019 | -.111 | -.109 | -.110 | -.110 | -.094 | -.095 | .120 | -.256 | -.264 | -.266 |
| 120 | -.011 | -.037 | -.080 | -.084 | -.077 | -.081 | -.076 | .135 | -.236 | -.236 | -.265 |
| 135 | -.082 | -.076 | -.075 | -.080 | -.072 | -.076 | -.076 | .150 | -.232 | -.228 | -.266 |
| 150 | -.076 | -.075 | -.075 | -.075 | -.075 | -.075 | -.075 | .180 | -.239 | -.237 | -.264 |
| 180 | -.073 | -.073 | -.073 | -.077 | -.072 | -.075 | -.075 | .210 | -.239 | -.239 | -.264 |
| 210 | -.071 | -.067 | -.072 | -.065 | -.070 | -.070 | -.070 | .225 | -.236 | -.236 | -.265 |
| 225 | -.067 | -.067 | -.067 | -.065 | -.065 | -.065 | -.065 | .240 | -.246 | -.246 | -.274 |
| 240 | -.060 | -.081 | -.086 | -.086 | -.084 | -.084 | -.084 | .270 | -.271 | -.271 | -.279 |
| 270 | -.024 | -.015 | -.022 | -.022 | -.022 | -.022 | -.022 | .300 | -.276 | -.276 | -.267 |
| 300 | -.031 | -.013 | -.022 | -.022 | -.022 | -.022 | -.022 | .315 | -.268 | -.268 | -.276 |
| 315 | -.025 | -.011 | -.029 | -.049 | -.049 | -.063 | -.075 | .350 | -.264 | -.263 | -.265 |
| 350 | -.026 | -.019 | -.052 | -.052 | -.052 | -.112 | -.112 | | | -.211 | -.200 |

TABLE V. - PRESSURE COEFFICIENTS FOR SATURN MODEL TANK

WITH SEAL STRIPS OFF - Continued

(f) $M = 1.30; \alpha = -8^\circ$

| x/l | θ_1 deg | $C_{p,t}$ for - | | | | $\phi = 0^\circ$ | θ , deg | $C_{p,t}$ for - | | | | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | |
|-------|-------------------|------------------|---------------------|-------------------|---------------------|------------------|-------------------|------------------|---------------------|-------------------|---------------------|-------------------|---------------------|-------------------|-----------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | | |
| .947 | 0 | .0145 .114 | .0148 .094 | .0122 .074 | .0118 .066 | 0.061 .061 | 0.061 .061 | 0.061 .060 | 0.061 .060 | 0.061 .060 | 0.061 .060 | 0.061 .060 | 0.061 .060 | 0.061 .060 | -0.113 -.117 |
| | 30 | .121 | .121 | .074 | .069 | .066 | .066 | .066 | .066 | .066 | .066 | .066 | .066 | .066 | -0.188 -.129 |
| | 45 | .127 | .066 | .059 | .054 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | -.090 -.071 |
| | 60 | .151 | .071 | .059 | .050 | .050 | .050 | .050 | .050 | .050 | .050 | .050 | .050 | .050 | -.109 -.070 |
| | 90 | .066 | .051 | .025 | .025 | .018 | .018 | .018 | .018 | .018 | .018 | .018 | .018 | .018 | -.173 -.173 |
| | 120 | .034 | .038 | .029 | .029 | .028 | .028 | .028 | .028 | .028 | .028 | .028 | .028 | .028 | -.155 -.155 |
| | 135 | .052 | .059 | .050 | .050 | .049 | .049 | .049 | .049 | .049 | .049 | .049 | .049 | .049 | -.151 -.151 |
| | 150 | .036 | .037 | .032 | .032 | .026 | .026 | .026 | .026 | .026 | .026 | .026 | .026 | .026 | -.153 -.153 |
| | 180 | .041 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | .035 | -.154 -.154 |
| | 210 | .041 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | -.156 -.156 |
| | 225 | .041 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | -.158 -.158 |
| | 240 | .026 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | -.110 -.110 |
| | 270 | .217 | .221 | .179 | .179 | .141 | .141 | .141 | .141 | .141 | .141 | .141 | .141 | .141 | -.166 -.166 |
| | 300 | .209 | .192 | .192 | .192 | .149 | .149 | .149 | .149 | .149 | .149 | .149 | .149 | .149 | -.158 -.158 |
| | 315 | .187 | .173 | .173 | .173 | .113 | .113 | .113 | .113 | .113 | .113 | .113 | .113 | .113 | -.163 -.163 |
| | 350 | .005 | .001 | .023 | .023 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | -.125 -.125 |
| | | .006 | .008 | .024 | .024 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | .040 | -.250 -.250 |
| | | .004 | .008 | .017 | .017 | .017 | .017 | .017 | .017 | .017 | .017 | .017 | .017 | .017 | -.205 -.205 |
| | | .004 | .012 | .025 | .025 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | -.214 -.214 |
| | | .002 | .003 | .045 | .045 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | -.240 -.240 |
| | | .008 | .011 | .025 | .025 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | -.248 -.248 |
| | | .010 | .012 | .015 | .015 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | .012 | -.216 -.216 |
| | | .027 | .027 | .045 | .045 | .024 | .024 | .024 | .024 | .024 | .024 | .024 | .024 | .024 | -.187 -.187 |
| | | .150 | .180 | .011 | .011 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | .003 | -.202 -.202 |
| | | .145 | .210 | .013 | .013 | .007 | .007 | .007 | .007 | .007 | .007 | .007 | .007 | .007 | -.197 -.197 |
| | | .120 | .225 | .011 | .011 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | -.202 -.202 |
| | | .135 | .240 | .010 | .010 | .009 | .009 | .009 | .009 | .009 | .009 | .009 | .009 | .009 | -.199 -.199 |
| | | .150 | .270 | .005 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | .004 | -.216 -.216 |
| | | .002 | .002 | .015 | .015 | .022 | .022 | .022 | .022 | .022 | .022 | .022 | .022 | .022 | -.250 -.250 |
| | | .005 | .003 | .014 | .014 | .015 | .015 | .015 | .015 | .015 | .015 | .015 | .015 | .015 | -.254 -.254 |
| | | .001 | .002 | .016 | .016 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | .020 | -.251 -.251 |
| | | .001 | .001 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | -.251 -.251 |
| | | .057 | .043 | .060 | .085 | .133 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | .104 | -.250 -.250 |
| | | .45 | .026 | .023 | .023 | .023 | .023 | .023 | .023 | .023 | .023 | .023 | .023 | .023 | -.257 -.257 |
| | | .60 | .040 | .048 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | .053 | -.235 -.235 |
| | | .90 | .042 | .057 | .071 | .064 | .064 | .064 | .064 | .064 | .064 | .064 | .064 | .064 | -.238 -.238 |
| | | .120 | .088 | .092 | .089 | .089 | .089 | .089 | .089 | .089 | .089 | .089 | .089 | .089 | -.243 -.243 |
| | | .135 | .074 | .076 | .078 | .078 | .078 | .078 | .078 | .078 | .078 | .078 | .078 | .078 | -.224 -.224 |
| | | .150 | .070 | .073 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | -.196 -.196 |
| | | .180 | .067 | .071 | .074 | .074 | .074 | .074 | .074 | .074 | .074 | .074 | .074 | .074 | -.193 -.193 |
| | | .210 | .061 | .063 | .067 | .067 | .067 | .067 | .067 | .067 | .067 | .067 | .067 | .067 | -.198 -.198 |
| | | .225 | .084 | .087 | .087 | .087 | .087 | .087 | .087 | .087 | .087 | .087 | .087 | .087 | -.186 -.186 |
| | | .240 | .072 | .078 | .080 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | .076 | -.206 -.206 |
| | | .270 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | .042 | -.211 -.211 |
| | | .300 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | .041 | -.211 -.211 |
| | | .315 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | .037 | -.236 -.236 |
| | | .350 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | .039 | -.237 -.237 |

TABLE V.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK

WITH SEAL STRIPS OFF - Continued

(g) $M = 1.30; \alpha = -4^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | | x/l | $\theta,$ deg | $C_{p,t}$ for - | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|-------|------------------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 0.947 | 0 | 0.146 | 0.147 | 0.145 | 0.147 | 0.164 | 0.121 | -0.083 | -0.092 | -0.105 | -0.121 |
| 30 | .125 | .119 | .104 | .095 | .095 | .007 | .011 | .083 | .087 | .103 | .099 |
| 45 | .133 | .125 | .106 | .095 | .095 | .022 | .024 | .081 | .091 | .105 | .083 |
| 60 | .139 | .127 | .101 | .095 | .095 | .024 | .025 | .080 | .093 | .105 | .080 |
| 90 | .158 | .138 | .106 | .098 | .098 | .026 | .026 | .089 | .099 | .105 | .099 |
| 120 | .012 | .000 | .007 | .022 | .022 | .011 | .006 | .089 | .124 | .124 | .100 |
| 135 | .025 | .022 | .024 | .024 | .024 | .024 | .023 | .168 | .168 | .171 | .174 |
| 150 | .024 | .024 | .026 | .026 | .026 | .026 | .025 | .148 | .148 | .151 | .150 |
| 180 | .029 | .028 | .026 | .026 | .026 | .027 | .026 | .150 | .146 | .151 | .148 |
| 210 | .051 | .051 | .051 | .051 | .051 | .027 | .027 | .180 | .144 | .154 | .147 |
| 225 | .031 | .027 | .025 | .025 | .025 | .027 | .027 | .210 | .149 | .154 | .149 |
| 240 | .031 | .028 | .026 | .026 | .026 | .028 | .028 | .225 | .152 | .158 | .152 |
| 270 | .028 | .028 | .026 | .026 | .026 | .048 | .048 | .240 | .160 | .165 | .160 |
| 300 | .212 | .195 | .174 | .182 | .174 | .048 | .040 | .270 | .091 | .088 | .106 |
| 315 | .197 | .172 | .153 | .144 | .144 | .174 | .174 | .300 | .086 | .086 | .128 |
| 330 | .176 | .158 | .153 | .153 | .153 | .171 | .164 | .315 | .080 | .088 | .120 |
| | | | | | | | | .330 | .081 | .090 | .119 |
| .709 | 0 | -.005 | -.010 | -.020 | -.023 | -.021 | -.026 | 0 | -.175 | -.186 | -.210 |
| 30 | -.002 | -.008 | -.017 | -.028 | -.028 | -.011 | -.014 | .30 | -.169 | -.180 | -.182 |
| 45 | -.000 | -.003 | -.010 | -.015 | -.015 | -.015 | -.014 | .45 | -.176 | -.192 | -.196 |
| 60 | -.006 | -.010 | -.018 | -.018 | -.018 | -.018 | -.018 | .60 | -.189 | -.209 | -.215 |
| 90 | -.001 | -.001 | -.006 | -.013 | -.013 | -.013 | -.013 | .90 | -.195 | -.220 | -.235 |
| 120 | .005 | .003 | .003 | .008 | .008 | .004 | .004 | .120 | -.200 | -.205 | -.213 |
| 135 | .006 | .005 | .002 | .002 | .002 | .001 | .001 | .135 | -.180 | -.186 | -.188 |
| 150 | .021 | .010 | .026 | .026 | .026 | .021 | .021 | .150 | -.194 | -.199 | -.207 |
| 180 | .008 | .008 | .005 | .005 | .005 | .002 | .002 | .180 | -.189 | -.191 | -.195 |
| 210 | .009 | .006 | .006 | .002 | .002 | .003 | .003 | .210 | -.193 | -.198 | -.204 |
| 225 | .007 | .003 | .003 | .001 | .001 | .002 | .002 | .225 | -.192 | -.196 | -.201 |
| 240 | .006 | .002 | .000 | .001 | .001 | .006 | .001 | .240 | -.199 | -.206 | -.206 |
| 270 | .001 | -.003 | -.006 | -.006 | -.006 | .001 | .001 | .270 | -.194 | -.195 | -.222 |
| 300 | -.007 | -.015 | -.022 | -.022 | -.022 | -.007 | -.007 | .300 | -.189 | -.179 | -.227 |
| 315 | -.001 | -.016 | -.019 | -.019 | -.019 | -.016 | -.016 | .315 | -.178 | -.178 | -.225 |
| 330 | -.006 | -.012 | -.019 | -.022 | -.022 | -.012 | -.012 | .330 | -.173 | -.165 | -.222 |
| | | | | | | | | | | | |
| .428 | 0 | -.042 | -.047 | -.056 | -.073 | -.069 | -.055 | .020 | 0 | -.190 | -.203 |
| 30 | -.039 | -.045 | -.050 | -.053 | -.053 | -.053 | -.053 | .30 | -.211 | -.218 | -.229 |
| 45 | -.021 | -.022 | -.041 | -.046 | -.046 | -.039 | -.037 | .45 | -.215 | -.224 | -.230 |
| 60 | -.041 | -.044 | -.040 | -.050 | -.058 | -.058 | -.047 | .60 | -.219 | -.227 | -.234 |
| 90 | -.044 | -.044 | -.044 | -.050 | -.058 | -.086 | -.086 | .90 | -.222 | -.230 | -.239 |
| 120 | -.079 | -.083 | -.079 | -.076 | -.076 | -.075 | -.072 | .120 | -.208 | -.211 | -.217 |
| 135 | -.069 | -.073 | -.070 | -.072 | -.072 | -.067 | -.067 | .135 | -.181 | -.181 | -.181 |
| 150 | -.065 | -.065 | -.070 | -.069 | -.069 | -.070 | -.065 | .150 | -.180 | -.179 | -.179 |
| 180 | -.063 | -.066 | -.066 | -.062 | -.062 | -.061 | -.061 | .180 | -.184 | -.188 | -.184 |
| 210 | -.055 | -.058 | -.058 | -.058 | -.058 | -.058 | -.058 | .210 | -.191 | -.195 | -.195 |
| 225 | -.078 | -.081 | -.081 | -.084 | -.085 | -.085 | -.085 | .225 | -.183 | -.192 | -.188 |
| 240 | -.067 | -.072 | -.075 | -.076 | -.076 | -.076 | -.076 | .240 | -.195 | -.201 | -.194 |
| 270 | -.043 | -.044 | -.047 | -.047 | -.047 | -.047 | -.047 | .270 | -.220 | -.227 | -.234 |
| 300 | -.040 | -.046 | -.046 | -.049 | -.049 | -.049 | -.049 | .300 | -.219 | -.229 | -.231 |
| 315 | -.038 | -.046 | -.046 | -.046 | -.046 | -.046 | -.046 | .315 | -.216 | -.223 | -.229 |
| 330 | -.041 | -.048 | -.048 | -.055 | -.055 | -.055 | -.055 | .330 | -.211 | -.219 | -.226 |

TABLE V.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF - Continued

(h) $M = 1.30; \alpha = 0^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | $C_{p,t}$ for - | | | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|-------------------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 0.947 | 0 | 0.187 | 0.181 | 0.180 | 0.176 | 0.172 | 0.083 | -0.089 | -0.087 | -0.086 |
| | 30 | .164 | .155 | .155 | .149 | .145 | -.086 | -.091 | -.080 | -.088 |
| | 45 | .166 | .158 | .158 | .153 | .151 | -.083 | -.088 | -.085 | -.085 |
| | 60 | .169 | .160 | .158 | .154 | .153 | -.081 | -.085 | -.083 | -.082 |
| | 90 | .181 | .175 | .175 | .172 | .169 | -.086 | -.090 | -.087 | -.088 |
| | 120 | -.006 | -.010 | -.009 | -.011 | -.008 | -.020 | -.120 | -.166 | -.165 |
| | 135 | .027 | .022 | .022 | .020 | .022 | -.023 | -.135 | -.142 | -.145 |
| | 150 | .029 | .022 | .023 | .021 | .023 | -.024 | -.150 | -.146 | -.144 |
| | 180 | .031 | .027 | .025 | .025 | .024 | -.025 | -.180 | -.139 | -.142 |
| | 210 | .032 | .028 | .027 | .025 | .023 | -.025 | -.210 | -.142 | -.147 |
| .709 | 225 | .030 | .026 | .024 | .023 | .025 | -.025 | -.225 | -.145 | -.150 |
| | 240 | .033 | .027 | .026 | .025 | .025 | -.025 | -.240 | -.153 | -.159 |
| | 270 | .036 | .036 | .030 | .032 | .036 | -.027 | -.270 | -.088 | -.092 |
| | 300 | .251 | .241 | .240 | .239 | .234 | -.036 | -.300 | -.085 | -.086 |
| | 315 | .222 | .214 | .212 | .206 | .205 | -.035 | -.315 | -.086 | -.087 |
| | 330 | .210 | .203 | .200 | .197 | .197 | -.035 | -.330 | -.086 | -.084 |
| | 0 | -.008 | -.011 | -.016 | -.017 | -.017 | 0 | -.119 | -.189 | -.189 |
| | 30 | -.004 | -.010 | -.013 | -.014 | -.013 | .0 | -.017 | -.185 | -.186 |
| | 45 | 0.00 | -.007 | -.009 | -.011 | -.009 | .0 | -.017 | -.189 | -.189 |
| | 60 | -.006 | -.013 | -.015 | -.015 | -.014 | .0 | -.017 | -.195 | -.195 |
| .428 | 90 | .002 | -.004 | -.004 | -.005 | -.006 | .006 | -.014 | -.206 | -.205 |
| | 120 | .006 | .002 | .002 | .002 | .000 | .000 | -.020 | -.208 | -.207 |
| | 135 | .006 | .002 | .002 | .000 | .000 | .000 | -.020 | -.192 | -.196 |
| | 150 | .017 | .017 | .017 | .017 | .017 | .051 | -.020 | -.173 | -.175 |
| | 180 | .007 | .002 | .001 | .001 | .001 | .001 | -.018 | -.187 | -.190 |
| | 210 | .003 | .002 | .001 | .001 | .001 | .001 | -.018 | -.182 | -.183 |
| | 225 | .006 | .000 | .000 | .000 | .000 | .000 | -.018 | -.186 | -.187 |
| | 240 | .006 | .001 | .001 | .001 | .001 | .001 | -.018 | -.188 | -.188 |
| | 270 | .000 | -.004 | -.005 | -.005 | -.007 | -.007 | -.018 | -.192 | -.193 |
| | 300 | -.006 | -.007 | -.010 | -.011 | -.011 | -.011 | -.018 | -.196 | -.195 |
| .30 | 315 | -.005 | -.006 | -.011 | -.011 | -.011 | -.011 | -.018 | -.208 | -.210 |
| | 330 | -.011 | -.013 | -.016 | -.017 | -.018 | -.018 | -.018 | -.207 | -.210 |
| | 0 | -.041 | -.044 | -.043 | -.046 | -.047 | 0 | -.020 | -.200 | -.210 |
| | 30 | -.039 | -.040 | -.043 | -.045 | -.045 | .047 | -.019 | -.201 | -.213 |
| | 45 | -.029 | -.032 | -.036 | -.037 | -.036 | .047 | -.019 | -.214 | -.214 |
| | 60 | -.039 | -.042 | -.045 | -.045 | -.045 | .047 | -.019 | -.215 | -.215 |
| | 90 | -.039 | -.042 | -.045 | -.045 | -.044 | .047 | -.019 | -.218 | -.220 |
| | 120 | -.077 | -.081 | -.082 | -.082 | -.081 | .070 | -.020 | -.204 | -.205 |
| | 135 | -.065 | -.070 | -.070 | -.069 | -.068 | .070 | -.018 | -.173 | -.178 |
| | 150 | -.061 | -.066 | -.066 | -.066 | -.065 | .066 | -.018 | -.168 | -.175 |
| .197 | 180 | -.064 | -.064 | -.064 | -.064 | -.065 | .064 | -.018 | -.178 | -.179 |
| | 210 | -.050 | -.056 | -.058 | -.057 | -.057 | .064 | -.018 | -.178 | -.179 |
| | 225 | -.075 | -.078 | -.079 | -.079 | -.079 | .068 | -.018 | -.174 | -.174 |
| | 240 | -.063 | -.069 | -.069 | -.069 | -.069 | .062 | -.018 | -.177 | -.177 |
| | 270 | -.039 | -.041 | -.042 | -.042 | -.042 | .042 | -.018 | -.174 | -.174 |
| | 300 | -.040 | -.041 | -.042 | -.042 | -.042 | .042 | -.018 | -.177 | -.177 |
| | 315 | -.040 | -.041 | -.042 | -.042 | -.042 | .042 | -.018 | -.178 | -.178 |
| | 330 | -.042 | -.043 | -.043 | -.043 | -.043 | .043 | -.018 | -.179 | -.179 |
| | 0 | -.044 | -.044 | -.044 | -.044 | -.044 | .044 | -.018 | -.179 | -.179 |
| | 30 | -.044 | -.045 | -.045 | -.045 | -.045 | .045 | -.018 | -.179 | -.179 |

TABLE V.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS OFF - Continued

(1) $M = 1.30$; $\alpha = 4^{\circ}$

| x/l | θ , deg | $C_{p,t}$ for - | | | | $C_{p,t}$ for - | | | |
|-------|-------------------|--------------------|-----------------------|---------------------|-----------------------|--------------------|-----------------------|---------------------|-----------------------|
| | | $\phi = 0^{\circ}$ | $\phi = 22.5^{\circ}$ | $\phi = 45^{\circ}$ | $\phi = 67.5^{\circ}$ | $\phi = 0^{\circ}$ | $\phi = 22.5^{\circ}$ | $\phi = 45^{\circ}$ | $\phi = 67.5^{\circ}$ |
| .947 | 0 | .208 | .176 | .152 | .106 | .072 | .082 | .106 | .118 |
| 30 | .188 | .165 | .145 | .116 | .088 | .074 | .107 | .117 | .117 |
| 45 | .187 | .164 | .139 | .126 | .071 | .064 | .101 | .105 | .114 |
| 60 | .182 | .154 | .126 | .117 | .056 | .053 | .104 | .108 | .119 |
| 90 | .192 | .162 | .132 | .129 | .122 | .072 | .061 | .095 | .106 |
| 120 | .066 | .001 | .004 | .000 | .003 | .067 | .063 | .104 | .114 |
| 135 | .023 | .018 | .019 | .018 | .021 | .120 | .173 | .174 | .168 |
| 150 | .028 | .021 | .020 | .019 | .022 | 135 | .148 | .150 | .153 |
| 180 | .028 | .023 | .021 | .021 | .023 | 150 | .148 | .151 | .148 |
| 210 | .028 | .025 | .022 | .022 | .025 | 180 | .144 | .146 | .148 |
| 225 | .027 | .024 | .021 | .021 | .023 | 210 | .150 | .152 | .152 |
| 240 | .027 | .024 | .022 | .022 | .024 | 225 | .153 | .156 | .156 |
| 270 | .033 | .034 | .031 | .033 | .032 | 240 | .164 | .166 | .164 |
| 300 | .296 | .290 | .300 | .279 | .252 | 270 | .077 | .076 | .090 |
| 315 | .268 | .260 | .261 | .252 | .253 | 300 | .076 | .069 | .082 |
| 330 | .264 | .249 | .240 | .227 | .205 | 315 | .072 | .070 | .073 |
| .709 | 0 | .012 | .022 | .032 | .029 | .119 | .177 | .181 | .195 |
| 30 | .009 | .019 | .023 | .016 | .016 | 30 | .185 | .198 | .203 |
| 45 | .009 | .015 | .017 | .016 | .014 | 45 | .193 | .207 | .212 |
| 60 | .017 | .022 | .022 | .020 | .019 | 60 | .205 | .219 | .213 |
| 90 | .005 | .009 | .009 | .006 | .005 | 90 | .205 | .219 | .225 |
| 120 | .002 | .001 | .003 | .001 | .001 | 120 | .200 | .205 | .202 |
| 135 | .003 | .000 | .000 | .001 | .001 | 135 | .180 | .185 | .182 |
| 150 | .033 | .038 | .032 | .037 | .046 | 150 | .197 | .199 | .198 |
| 180 | .004 | .001 | .000 | .003 | .002 | 180 | .189 | .192 | .197 |
| 210 | .005 | .002 | .001 | .000 | .003 | 210 | .194 | .197 | .198 |
| 225 | .003 | .000 | .002 | .001 | .001 | 225 | .192 | .193 | .194 |
| 240 | .003 | .000 | .002 | .001 | .000 | 240 | .199 | .201 | .201 |
| 270 | .005 | .008 | .011 | .014 | .012 | 270 | .205 | .204 | .218 |
| 300 | .009 | .011 | .015 | .015 | .008 | 300 | .206 | .203 | .221 |
| 315 | .007 | .011 | .018 | .019 | .013 | 315 | .194 | .188 | .195 |
| 330 | .014 | .021 | .029 | .032 | .033 | 330 | .161 | .175 | .183 |
| .428 | 0 | .055 | .045 | .059 | .063 | .020 | 0 | .192 | .196 |
| 30 | .034 | .045 | .056 | .057 | .068 | 30 | .216 | .220 | .204 |
| 45 | .027 | .036 | .046 | .048 | .051 | 45 | .216 | .221 | .225 |
| 60 | .038 | .049 | .049 | .061 | .063 | 60 | .219 | .223 | .223 |
| 90 | .035 | .042 | .047 | .047 | .048 | 90 | .224 | .228 | .227 |
| 120 | .084 | .086 | .087 | .084 | .083 | 120 | .208 | .211 | .213 |
| 135 | .070 | .072 | .073 | .073 | .072 | 135 | .182 | .184 | .184 |
| 150 | .066 | .069 | .070 | .069 | .068 | 150 | .180 | .182 | .179 |
| 180 | .063 | .068 | .067 | .067 | .066 | 180 | .187 | .189 | .178 |
| 210 | .057 | .059 | .063 | .060 | .059 | 210 | .185 | .188 | .186 |
| 225 | .061 | .083 | .086 | .084 | .082 | 225 | .184 | .188 | .184 |
| 240 | .069 | .072 | .074 | .073 | .072 | 240 | .198 | .199 | .196 |
| 270 | .034 | .036 | .040 | .044 | .046 | 270 | .222 | .224 | .225 |
| 300 | .036 | .034 | .038 | .041 | .037 | 300 | .218 | .221 | .223 |
| 315 | .033 | .033 | .043 | .043 | .045 | 315 | .217 | .219 | .222 |
| 330 | .036 | .040 | .048 | .053 | .058 | 330 | .216 | .218 | .219 |

TABLE V - PRESSURE COEFFICIENTS FOR SATURN MODEL, TANK
WITH SEAL STRIPS OFF - Concluded

(J) $M = 1.20; \alpha = 8^\circ$

| x/l | θ_2 deg | C _{p,t} for - | | | | C _{p,t} for - | | | |
|-------|-------------------|------------------------|---------------------|-------------------|---------------------|------------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.302 | 0.218 | 0.118 | 0.045 | 0.045 | -0.018 | -0.059 | -0.128 |
| | 30 | .254 | .185 | .092 | .050 | .065 | .026 | .070 | .140 |
| | 45 | .255 | .119 | .033 | .033 | .009 | .025 | .061 | .115 |
| | 60 | .250 | .169 | .068 | .058 | .033 | .018 | .055 | .113 |
| | 90 | .284 | .158 | .068 | .058 | .033 | .024 | .047 | .113 |
| | 120 | -.015 | .017 | .023 | .023 | .021 | .029 | .047 | .113 |
| | 135 | .044 | .023 | .035 | .028 | .028 | .036 | .077 | .141 |
| | 150 | .036 | .023 | .027 | .027 | .027 | .035 | .193 | .341 |
| | 180 | .044 | .024 | .028 | .025 | .025 | .035 | .193 | .341 |
| | 210 | .042 | .029 | .032 | .032 | .032 | .039 | .193 | .341 |
| | 225 | .044 | .029 | .037 | .031 | .031 | .036 | .193 | .341 |
| | 240 | .045 | .029 | .038 | .031 | .031 | .039 | .193 | .341 |
| | 270 | .045 | .041 | .034 | .040 | .040 | .040 | .193 | .341 |
| | 300 | .384 | .276 | .386 | .295 | .195 | .031 | .031 | .031 |
| | 315 | .354 | .336 | .335 | .295 | .170 | .031 | .031 | .031 |
| | 330 | .337 | .312 | .277 | .198 | .117 | .031 | .031 | .031 |
| | | | | | | | | | |
| | .709 | 0 | -.007 | -.053 | -.070 | -.069 | -.072 | -.053 | -.192 |
| | | 30 | -.006 | -.043 | -.028 | -.028 | -.039 | 0 | -.218 |
| | | 45 | -.005 | -.025 | -.024 | -.025 | -.044 | .0 | -.250 |
| | | 60 | -.015 | -.027 | -.025 | -.025 | -.059 | .0 | -.254 |
| | | 90 | -.005 | -.013 | -.014 | -.014 | -.053 | .0 | -.253 |
| | | 120 | .001 | -.001 | -.001 | -.001 | -.053 | .0 | -.253 |
| | | 135 | .004 | -.001 | -.001 | -.001 | -.049 | .0 | -.253 |
| | | 150 | .036 | -.034 | -.034 | -.034 | -.036 | .0 | -.253 |
| | | 180 | .005 | -.001 | -.001 | -.001 | -.007 | .0 | -.253 |
| | | 210 | .005 | -.002 | -.002 | -.002 | -.007 | .0 | -.253 |
| | | 225 | .002 | -.003 | -.003 | -.003 | -.005 | .0 | -.253 |
| | | 240 | .000 | -.003 | -.003 | -.003 | -.003 | .0 | -.253 |
| | | 270 | .000 | -.005 | -.007 | -.007 | -.017 | .0 | -.253 |
| | | 300 | -.007 | -.008 | -.013 | -.014 | -.004 | .0 | -.253 |
| | | 315 | -.004 | -.008 | -.024 | -.032 | -.024 | .0 | -.253 |
| | | 330 | -.012 | -.019 | -.046 | -.060 | -.066 | .0 | -.253 |
| | | | | | | | | | |
| | .428 | 0 | -.025 | -.043 | -.094 | -.127 | -.144 | 0 | -.214 |
| | | 30 | -.028 | -.060 | -.064 | -.064 | -.090 | .0 | -.214 |
| | | 45 | -.020 | -.045 | -.075 | -.075 | -.075 | .0 | -.214 |
| | | 60 | -.031 | -.051 | -.087 | -.087 | -.089 | .0 | -.214 |
| | | 90 | -.027 | -.038 | -.064 | -.064 | -.064 | .0 | -.214 |
| | | 120 | -.017 | -.01 | -.009 | -.009 | -.009 | .0 | -.214 |
| | | 135 | -.083 | -.079 | -.076 | -.076 | -.074 | .0 | -.214 |
| | | 150 | -.078 | -.076 | -.078 | -.078 | -.072 | .0 | -.214 |
| | | 180 | -.076 | -.075 | -.074 | -.074 | -.073 | .0 | -.214 |
| | | 210 | -.068 | -.071 | -.073 | -.073 | -.067 | .0 | -.214 |
| | | 225 | -.096 | -.06 | -.05 | -.05 | -.092 | .0 | -.214 |
| | | 240 | -.084 | -.080 | -.081 | -.080 | -.080 | .0 | -.214 |
| | | 270 | -.024 | -.018 | -.006 | -.006 | -.041 | .0 | -.214 |
| | | 300 | -.030 | -.016 | -.026 | -.026 | -.027 | .0 | -.214 |
| | | 315 | -.027 | -.014 | -.025 | -.025 | -.066 | .0 | -.214 |
| | | 330 | -.029 | -.012 | -.022 | -.022 | -.090 | .0 | -.214 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON

(a) $\alpha = 0^\circ$; $\phi = 0^\circ$

| x/l | θ_s deg | $C_{p,t}$ for - | | | | $C_{p,t}$ for - | | | | $C_{p,t}$ for - | | | | |
|-------|-------------------|-----------------|----------|----------|----------|-----------------|----------|-------|----------|-----------------|----------|----------|----------|----------|
| | | M = 0.80 | M = 0.90 | M = 0.95 | M = 1.00 | M = 1.03 | M = 1.15 | | M = 0.80 | M = 0.90 | M = 0.95 | M = 1.00 | M = 1.03 | M = 1.15 |
| 0.347 | 0 | 0.032 | 0.026 | 0.094 | 0.143 | 0.164 | 0.212 | 0.250 | 0 | 0.009 | 0.012 | -0.056 | -0.125 | -0.096 |
| 30 | .004 | .058 | .064 | .117 | .136 | .154 | .193 | 30 | .006 | .012 | -0.059 | -0.129 | -0.101 | -0.068 |
| 45 | .025 | .050 | .085 | .115 | .160 | .178 | .205 | 45 | .010 | .017 | -0.059 | -0.131 | -0.102 | -0.069 |
| 60 | .051 | .079 | .115 | .154 | .235 | .254 | .263 | 60 | .014 | .023 | -0.054 | -0.127 | -0.097 | -0.064 |
| 90 | .168 | .199 | .252 | .295 | .576 | .576 | .538 | 90 | .019 | .021 | -0.047 | -0.124 | -0.094 | -0.069 |
| 120 | .492 | .532 | .570 | .576 | .482 | .482 | .428 | 120 | .153 | .179 | -0.295 | -0.334 | -0.298 | -0.215 |
| 135 | .273 | .310 | .470 | .476 | .443 | .443 | .342 | 135 | .292 | .301 | -0.318 | -0.434 | -0.462 | -0.321 |
| 150 | .288 | .313 | .425 | .429 | .474 | .474 | .336 | 150 | .301 | .328 | -0.448 | -0.479 | -0.482 | -0.333 |
| 180 | .281 | .303 | .418 | .429 | .429 | .429 | .391 | 180 | .303 | .322 | -0.452 | -0.485 | -0.485 | -0.358 |
| 210 | .276 | .302 | .415 | .426 | .389 | .389 | .293 | 210 | .302 | .330 | -0.451 | -0.482 | -0.482 | -0.335 |
| 225 | .273 | .299 | .411 | .422 | .385 | .385 | .290 | 225 | .303 | .332 | -0.452 | -0.484 | -0.484 | -0.336 |
| 240 | .273 | .297 | .408 | .422 | .386 | .386 | .290 | 240 | .179 | .215 | -0.524 | -0.561 | -0.561 | -0.333 |
| 270 | .350 | .357 | .416 | .414 | .392 | .392 | .271 | 270 | .018 | .032 | -0.049 | -0.122 | -0.122 | -0.065 |
| 300 | .158 | .189 | .230 | .264 | .279 | .279 | .262 | 300 | .012 | .026 | -0.054 | -0.127 | -0.127 | -0.068 |
| 315 | .120 | .150 | .189 | .224 | .238 | .238 | .225 | 315 | .012 | .021 | -0.058 | -0.130 | -0.130 | -0.067 |
| 330 | .082 | .111 | .151 | .191 | .209 | .209 | .215 | 330 | .011 | .015 | -0.058 | -0.129 | -0.129 | -0.066 |
| .709 | 0 | .006 | .016 | .045 | .029 | .006 | -.004 | .119 | 0 | -.095 | .223 | -.344 | -.375 | -.100 |
| 30 | .009 | .021 | .048 | .031 | .003 | .000 | .002 | 30 | -.092 | .231 | -.356 | -.356 | -.353 | -.218 |
| 45 | .011 | .022 | .051 | .051 | .033 | .000 | .002 | 45 | -.096 | .242 | -.349 | -.353 | -.353 | -.205 |
| 60 | .007 | .018 | .046 | .046 | .028 | .004 | -.003 | 60 | -.100 | .247 | -.356 | -.359 | -.359 | -.204 |
| 90 | .014 | .027 | .059 | .059 | .034 | .003 | .003 | 90 | -.096 | .241 | -.354 | -.362 | -.362 | -.206 |
| 120 | .097 | .096 | .145 | .145 | .203 | .176 | .118 | 120 | .263 | .313 | -.432 | -.459 | -.459 | -.310 |
| 135 | .290 | .318 | .433 | .467 | .427 | .394 | .324 | 135 | .294 | .322 | -.440 | -.470 | -.470 | -.322 |
| 150 | .422 | .425 | .477 | .467 | .436 | .467 | .397 | 150 | .304 | .332 | -.455 | -.485 | -.485 | -.338 |
| 180 | .283 | .309 | .421 | .453 | .415 | .453 | .312 | 180 | .302 | .320 | -.453 | -.485 | -.485 | -.336 |
| 210 | .291 | .316 | .432 | .466 | .425 | .425 | .321 | 210 | .302 | .329 | -.450 | -.479 | -.479 | -.334 |
| 225 | --- | --- | --- | --- | --- | --- | --- | 225 | .301 | .329 | -.452 | -.482 | -.482 | -.336 |
| 240 | .286 | .301 | .399 | .360 | .267 | .003 | .001 | 240 | .210 | .304 | -.423 | -.447 | -.447 | -.322 |
| 270 | .069 | .021 | .053 | .028 | .003 | .002 | .002 | 270 | .098 | .270 | -.298 | -.364 | -.364 | -.200 |
| 300 | .012 | .023 | .053 | .033 | .002 | .001 | .001 | 300 | .101 | .248 | -.354 | -.361 | -.361 | -.199 |
| 315 | .011 | .024 | .052 | .052 | .003 | .001 | -.001 | 315 | .097 | .241 | -.351 | -.355 | -.355 | -.202 |
| 330 | .005 | .017 | .045 | .045 | .007 | -.006 | -.006 | 330 | -.094 | .230 | -.343 | -.358 | -.358 | -.216 |
| .428 | 0 | .007 | .031 | .047 | .054 | -.040 | -.029 | .020 | 0 | -.301 | -.396 | -.494 | -.494 | -.307 |
| 30 | .009 | .035 | .047 | .054 | .049 | -.040 | -.028 | 30 | -.301 | -.349 | -.48 | -.529 | -.542 | -.375 |
| 45 | .014 | .040 | .054 | .054 | .033 | -.041 | -.023 | 45 | -.301 | -.356 | -.423 | -.514 | -.558 | -.391 |
| 60 | .009 | .036 | .051 | .054 | .041 | -.025 | -.020 | 60 | -.301 | -.356 | -.423 | -.514 | -.558 | -.391 |
| 90 | .014 | .046 | .060 | .060 | .048 | -.026 | -.018 | 90 | -.317 | -.380 | -.477 | -.547 | -.597 | -.407 |
| 120 | .233 | .288 | .371 | .406 | .368 | .275 | .215 | 120 | .307 | .332 | -.457 | -.487 | -.487 | -.339 |
| 135 | .301 | .327 | .446 | .479 | .438 | .333 | .275 | 135 | .305 | .332 | -.455 | -.487 | -.487 | -.339 |
| 150 | .299 | .327 | .446 | .478 | .438 | .332 | .277 | 150 | .305 | .334 | -.454 | -.488 | -.488 | -.340 |
| 180 | .299 | .325 | .445 | .477 | .437 | .332 | .271 | 180 | .303 | .331 | -.452 | -.484 | -.484 | -.336 |
| 210 | .292 | .318 | .436 | .467 | .427 | .321 | .271 | 210 | .306 | .334 | -.456 | -.487 | -.487 | -.340 |
| 225 | .182 | .186 | .275 | .292 | .222 | .029 | -.029 | 225 | .307 | .336 | -.457 | -.489 | -.489 | -.342 |
| 240 | .298 | .296 | .445 | .477 | .333 | .050 | .037 | 240 | .312 | .344 | -.466 | -.497 | -.497 | -.347 |
| 270 | .011 | .042 | .056 | .056 | .042 | .039 | .030 | 270 | .318 | .383 | -.507 | -.531 | -.531 | -.372 |
| 300 | .012 | .042 | .056 | .051 | .038 | .030 | .029 | 300 | .300 | .357 | -.421 | -.453 | -.453 | -.397 |
| 315 | .011 | .038 | .053 | .053 | .029 | .028 | .028 | 315 | .315 | .333 | -.392 | -.401 | -.401 | -.354 |
| 330 | .008 | .033 | .048 | .048 | .024 | -.024 | -.024 | 330 | .310 | .328 | -.401 | -.512 | -.512 | -.354 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK

WITH SEAL STRIPS ON - Continued.

(b) $M = 1.20; \alpha = -8^\circ$

| x/l | θ , deg | $C_{b,t}$ for - | | | | x/l | θ , deg | $C_{b,t}$ for - | | | |
|-------|----------------|------------------|---------------------|-------------------|---------------------|-------|----------------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 0.947 | 0 | 0.152 | 0.116 | 0.187 | 0.190 | 0.192 | .152 | -0.069 | -0.067 | -0.081 | -0.118 |
| 30 | .129 | .120 | .151 | .156 | .156 | .155 | .073 | -.057 | -.044 | -.069 | -.091 |
| 45 | .147 | .127 | .156 | .175 | .185 | .185 | .055 | -.045 | -.044 | -.052 | -.061 |
| 60 | .166 | .141 | .168 | .168 | .201 | .201 | .062 | -.055 | -.055 | -.061 | -.065 |
| 90 | .224 | .200 | .206 | .224 | .249 | .249 | .067 | -.078 | -.078 | -.076 | -.076 |
| 120 | .392 | .466 | .410 | .408 | .406 | .406 | .202 | -.219 | -.219 | -.228 | -.221 |
| 135 | .320 | .369 | .330 | .332 | .334 | .334 | .306 | -.320 | -.320 | -.328 | -.321 |
| 150 | .315 | .353 | .319 | .324 | .324 | .324 | .318 | -.326 | -.326 | -.326 | -.325 |
| 180 | .279 | .298 | .297 | .301 | .299 | .299 | .180 | -.319 | -.329 | -.326 | -.327 |
| 210 | .277 | .294 | .296 | .296 | .296 | .296 | .210 | -.318 | -.324 | -.321 | -.327 |
| 225 | .277 | .293 | .291 | .294 | .293 | .293 | .225 | -.320 | -.326 | -.325 | -.327 |
| 240 | .276 | .297 | .288 | .292 | .292 | .292 | .240 | -.217 | -.222 | -.221 | -.225 |
| 270 | .256 | .270 | .247 | .247 | .248 | .248 | .270 | -.067 | -.073 | -.063 | -.065 |
| 300 | .271 | .226 | .226 | .209 | .197 | .197 | .300 | -.066 | -.078 | -.113 | -.129 |
| 315 | .232 | .152 | .194 | .192 | .190 | .190 | .315 | -.066 | -.076 | -.107 | -.114 |
| 330 | .217 | .147 | .194 | .195 | .197 | .197 | .330 | -.070 | -.073 | -.088 | -.096 |
| .709 | 0 | -.001 | .004 | -.019 | -.015 | -.015 | .119 | 0 | -.171 | -.165 | -.221 |
| 30 | .004 | .006 | -.021 | -.021 | -.056 | -.075 | .30 | -.157 | -.161 | -.200 | -.214 |
| 45 | .005 | .005 | -.017 | -.017 | -.051 | -.058 | .45 | -.157 | -.169 | -.223 | -.228 |
| 60 | -.010 | -.015 | -.025 | -.025 | -.051 | -.057 | .60 | -.143 | -.216 | -.260 | -.210 |
| 90 | -.007 | -.027 | -.060 | -.067 | -.054 | -.054 | .90 | -.145 | -.228 | -.272 | -.233 |
| 120 | -.111 | -.129 | -.148 | -.156 | -.156 | -.156 | .120 | -.281 | -.304 | -.310 | -.314 |
| 135 | -.307 | -.317 | -.314 | -.318 | -.318 | -.318 | .135 | -.303 | -.311 | -.312 | -.311 |
| 150 | -.242 | -.219 | -.219 | -.223 | -.261 | -.261 | .150 | -.321 | -.331 | -.326 | -.329 |
| 180 | -.298 | -.306 | -.303 | -.308 | -.308 | -.308 | .180 | -.320 | -.328 | -.326 | -.328 |
| 210 | -.305 | -.315 | -.312 | -.317 | -.317 | -.317 | .210 | -.317 | -.328 | -.323 | -.325 |
| 225 | --- | --- | --- | -.318 | -.317 | -.317 | .225 | -.318 | -.326 | -.323 | -.326 |
| 240 | -.256 | -.265 | -.269 | -.280 | -.279 | -.279 | .240 | -.263 | -.260 | -.287 | -.304 |
| 270 | -.010 | -.009 | -.005 | -.034 | -.058 | -.058 | .270 | -.153 | -.098 | -.218 | -.210 |
| 300 | -.005 | .008 | -.015 | -.047 | -.066 | -.066 | .300 | -.188 | -.116 | -.192 | -.203 |
| 315 | .003 | .006 | -.011 | -.038 | -.060 | -.060 | .315 | -.188 | -.130 | -.186 | -.208 |
| 330 | -.002 | .002 | -.014 | -.041 | -.065 | -.065 | .330 | -.188 | -.139 | -.183 | -.203 |
| .428 | 0 | -.025 | -.024 | -.022 | -.081 | -.081 | .020 | 0 | -.229 | -.273 | -.303 |
| 30 | .024 | -.024 | -.022 | -.048 | -.055 | -.055 | .30 | --- | --- | --- | -.323 |
| 45 | .016 | -.016 | -.016 | -.035 | -.052 | -.052 | .45 | .312 | -.339 | -.339 | -.336 |
| 60 | -.028 | -.028 | -.028 | -.041 | -.029 | -.031 | .60 | .341 | -.345 | -.348 | -.352 |
| 90 | -.034 | -.034 | -.053 | -.068 | -.064 | -.057 | .90 | .339 | -.346 | -.346 | -.347 |
| 120 | -.261 | -.274 | -.278 | -.276 | -.260 | -.260 | .120 | -.320 | -.352 | -.351 | -.350 |
| 135 | -.316 | -.325 | -.325 | -.325 | -.325 | -.325 | .135 | -.321 | -.329 | -.327 | -.329 |
| 150 | -.308 | -.325 | -.327 | -.327 | -.326 | -.326 | .150 | -.320 | -.328 | -.328 | -.327 |
| 180 | -.317 | -.325 | -.323 | -.327 | -.326 | -.326 | .180 | -.321 | -.329 | -.325 | -.328 |
| 210 | -.303 | -.313 | -.313 | -.313 | -.313 | -.313 | .210 | -.321 | -.329 | -.326 | -.328 |
| 225 | -.210 | -.221 | -.208 | -.209 | -.217 | -.217 | .225 | -.320 | -.329 | -.326 | -.327 |
| 240 | -.315 | -.322 | -.318 | -.318 | -.317 | -.317 | .240 | -.325 | -.332 | -.328 | -.334 |
| 270 | -.028 | -.028 | -.048 | -.051 | -.051 | -.051 | .270 | -.324 | -.329 | -.323 | -.321 |
| 300 | -.022 | -.022 | -.045 | -.078 | -.083 | -.083 | .300 | -.342 | -.364 | -.445 | -.342 |
| 315 | -.025 | -.025 | -.045 | -.078 | -.083 | -.083 | .315 | -.317 | -.323 | -.323 | -.315 |
| 330 | -.027 | -.027 | -.043 | -.078 | -.083 | -.083 | .330 | -.312 | -.323 | -.323 | -.328 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(c) $M = 1.20; \alpha = -4^\circ$

| x/l | θ, deg | C _{p,t} for - | | | | C _{p,t} for - | | | |
|-------|----------------------|------------------------|---------------------|-------------------|---------------------|------------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.154 | 0.164 | 0.180 | 0.212 | 0.226 | 0 | -0.065 | -0.064 |
| | 30 | .156 | .156 | .169 | .191 | .191 | .30 | -0.058 | -0.058 |
| | 45 | .152 | .178 | .188 | .207 | .218 | .45 | -0.054 | -0.050 |
| | 60 | .168 | .194 | .201 | .218 | .230 | 60 | -0.050 | -0.045 |
| | 90 | .213 | .245 | .256 | .275 | .286 | 90 | -0.043 | -0.039 |
| | 120 | .383 | .397 | .400 | .402 | .402 | 120 | -0.037 | -0.032 |
| | 135 | .312 | .314 | .320 | .322 | .322 | 135 | -0.031 | -0.026 |
| | 150 | .305 | .311 | .309 | .312 | .312 | 150 | -0.027 | -0.020 |
| | 180 | .271 | .287 | .287 | .283 | .283 | 180 | -0.021 | -0.015 |
| | 210 | .269 | .278 | .279 | .281 | .281 | 210 | -0.018 | -0.011 |
| | 225 | .267 | .276 | .277 | .277 | .277 | 225 | -0.015 | -0.009 |
| | 240 | .268 | .274 | .277 | .277 | .277 | 240 | -0.012 | -0.006 |
| | 270 | .235 | .247 | .245 | .227 | .216 | 270 | -0.006 | -0.003 |
| | 300 | .237 | .219 | .218 | .212 | .200 | 300 | -0.006 | -0.008 |
| | 315 | .217 | .189 | .182 | .210 | .230 | 315 | -0.004 | -0.007 |
| | 330 | .191 | .172 | .182 | .214 | .250 | 330 | -0.005 | -0.009 |
| | | | | | | | .119 | 0 | .181 |
| | | | | | | | | .181 | .188 |
| | | | | | | | | .188 | .205 |
| | | | | | | | | .205 | .233 |
| | | | | | | | | .233 | .241 |
| | | | | | | | | .241 | .182 |
| | | | | | | | | .182 | .166 |
| | | | | | | | | .166 | .174 |
| | | | | | | | | .174 | .173 |
| | | | | | | | | .173 | .191 |
| | | | | | | | | .191 | .195 |
| | | | | | | | | .195 | .202 |
| | | | | | | | | .202 | .205 |
| | | | | | | | | .205 | .285 |
| | | | | | | | | .285 | .284 |
| | | | | | | | | .284 | .299 |
| | | | | | | | | .299 | .296 |
| | | | | | | | | .296 | .313 |
| | | | | | | | | .313 | .315 |
| | | | | | | | | .315 | .309 |
| | | | | | | | | .309 | .313 |
| | | | | | | | | .313 | .308 |
| | | | | | | | | .308 | .312 |
| | | | | | | | | .312 | .278 |
| | | | | | | | | .278 | .202 |
| | | | | | | | | .202 | .183 |
| | | | | | | | | .183 | .194 |
| | | | | | | | | .194 | .212 |
| | | | | | | | | .212 | .220 |
| | | | | | | | | .220 | .235 |
| | | | | | | | | .235 | .233 |
| | | | | | | | | .233 | .283 |
| | | | | | | | | .283 | .313 |
| | | | | | | | | .313 | .317 |
| | | | | | | | | .317 | .332 |
| | | | | | | | | .332 | .337 |
| | | | | | | | | .337 | .351 |
| | | | | | | | | .351 | .349 |
| | | | | | | | | .349 | .316 |
| | | | | | | | | .316 | .317 |
| | | | | | | | | .317 | .316 |
| | | | | | | | | .316 | .315 |
| | | | | | | | | .315 | .313 |
| | | | | | | | | .313 | .312 |
| | | | | | | | | .312 | .312 |
| | | | | | | | | .312 | .316 |
| | | | | | | | | .316 | .321 |
| | | | | | | | | .321 | .321 |
| | | | | | | | | .321 | .322 |
| | | | | | | | | .322 | .323 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(d) $M = 1.20; \alpha = 0^\circ$

| x/l | θ , deg | $C_{p,t}$ for - | | | $C_{p,t}$ for - | | | $C_{p,t}$ for - | | |
|-------|----------------|------------------|---------------------|-------------------|---------------------|-------------------|--------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.202 | 0.202 | 0.199 | 0.197 | 0.194 | 0.045 | -0.041 | -0.056 | -0.052 |
| 30 | .185 | .186 | .179 | .177 | .170 | .166 | -0.049 | -0.059 | -0.054 | -0.053 |
| 45 | .196 | .196 | .191 | .187 | .186 | .186 | -0.050 | -0.057 | -0.052 | -0.052 |
| 60 | .209 | .209 | .201 | .201 | .200 | .195 | -0.049 | -0.048 | -0.053 | -0.048 |
| 90 | .259 | .260 | .255 | .255 | .252 | .252 | -0.053 | -0.053 | -0.050 | -0.052 |
| 120 | .396 | .399 | .398 | .394 | .398 | .398 | -0.050 | -0.053 | -0.059 | -0.059 |
| 135 | .315 | .315 | .318 | .315 | .315 | .315 | -0.053 | -0.053 | -0.053 | -0.053 |
| 150 | .307 | .312 | .312 | .307 | .311 | .311 | -0.054 | -0.051 | -0.051 | -0.051 |
| 180 | .272 | .289 | .288 | .288 | .288 | .288 | -0.058 | -0.058 | -0.058 | -0.058 |
| 210 | .270 | .280 | .280 | .282 | .281 | .281 | -0.059 | -0.059 | -0.059 | -0.059 |
| 225 | .268 | .278 | .278 | .279 | .278 | .278 | -0.057 | -0.057 | -0.057 | -0.057 |
| 240 | .268 | .276 | .279 | .278 | .278 | .278 | -0.057 | -0.057 | -0.057 | -0.057 |
| 270 | .237 | .248 | .246 | .246 | .245 | .245 | -0.050 | -0.050 | -0.050 | -0.050 |
| 300 | .282 | .284 | .280 | .279 | .275 | .275 | -0.059 | -0.059 | -0.059 | -0.059 |
| 315 | .246 | .249 | .244 | .244 | .243 | .243 | -0.055 | -0.055 | -0.055 | -0.055 |
| 330 | .228 | .231 | .225 | .225 | .224 | .224 | -0.050 | -0.050 | -0.050 | -0.050 |
| .709 | 0 | -.022 | -.023 | -.021 | -.024 | -.024 | 0 | -.223 | -.218 | -.215 |
| 30 | .019 | -.019 | -.017 | -.017 | -.017 | -.018 | .30 | -.196 | -.194 | -.192 |
| 45 | -.017 | -.017 | -.018 | -.018 | -.018 | -.018 | .45 | -.181 | -.175 | -.174 |
| 60 | -.024 | -.023 | -.024 | -.024 | -.024 | -.024 | .60 | -.177 | -.169 | -.170 |
| 90 | -.020 | -.018 | -.019 | -.018 | -.021 | -.021 | .90 | -.176 | -.166 | -.167 |
| 120 | -.112 | -.117 | -.118 | -.118 | -.121 | -.121 | .120 | -.219 | -.219 | -.217 |
| 135 | -.297 | -.302 | -.302 | -.299 | -.301 | -.301 | .135 | -.291 | -.291 | -.298 |
| 150 | -.245 | -.248 | -.249 | -.249 | -.259 | -.259 | .150 | -.308 | -.314 | -.313 |
| 180 | -.287 | -.292 | -.292 | -.291 | -.292 | -.292 | .180 | -.307 | -.314 | -.312 |
| 210 | -.295 | -.301 | -.301 | -.299 | -.301 | -.301 | .210 | -.305 | -.313 | -.306 |
| 225 | ----- | ----- | ----- | ----- | ----- | ----- | .225 | ----- | ----- | ----- |
| 240 | -.243 | -.251 | -.256 | -.258 | -.257 | -.257 | .240 | -.265 | -.265 | -.266 |
| 270 | -.017 | -.019 | -.017 | -.017 | -.020 | -.020 | .270 | -.185 | -.176 | -.174 |
| 300 | -.016 | -.016 | -.019 | -.019 | -.016 | -.018 | .300 | -.185 | -.175 | -.173 |
| 315 | -.016 | -.017 | -.017 | -.018 | -.014 | -.018 | .315 | -.188 | -.179 | -.175 |
| 330 | -.022 | -.024 | -.026 | -.026 | -.025 | -.025 | .330 | -.202 | -.194 | -.189 |
| .428 | 0 | -.024 | -.026 | -.025 | -.030 | -.033 | 0 | -.272 | -.271 | -.270 |
| 30 | .026 | -.026 | -.023 | -.023 | -.029 | -.029 | .30 | ----- | ----- | ----- |
| 45 | -.020 | -.023 | -.023 | -.023 | -.028 | -.028 | .45 | -.344 | -.344 | -.343 |
| 60 | -.030 | -.034 | -.038 | -.034 | -.036 | -.036 | .60 | -.355 | -.361 | -.357 |
| 90 | -.030 | -.033 | -.035 | -.034 | -.033 | -.033 | .90 | -.347 | -.353 | -.351 |
| 120 | -.449 | -.451 | -.452 | -.452 | -.448 | -.448 | .120 | -.310 | -.315 | -.314 |
| 135 | -.304 | -.309 | -.310 | -.308 | -.310 | -.308 | .135 | -.309 | -.315 | -.314 |
| 150 | -.304 | -.309 | -.309 | -.308 | -.309 | -.308 | .150 | -.308 | -.314 | -.313 |
| 180 | -.104 | -.104 | -.104 | -.104 | -.104 | -.104 | .180 | -.308 | -.312 | -.312 |
| 210 | -.291 | -.297 | -.297 | -.296 | -.296 | -.296 | .210 | -.309 | -.315 | -.314 |
| 225 | -.201 | -.203 | -.205 | -.204 | -.204 | -.204 | .225 | -.309 | -.315 | -.314 |
| 240 | -.304 | -.307 | -.306 | -.302 | -.301 | -.301 | .240 | -.316 | -.320 | -.320 |
| 270 | -.022 | -.023 | -.021 | -.021 | -.021 | -.021 | .270 | -.338 | -.342 | -.341 |
| 300 | -.021 | -.023 | -.022 | -.022 | -.023 | -.023 | .300 | -.359 | -.364 | -.366 |
| 315 | -.020 | -.021 | -.022 | -.022 | -.023 | -.023 | .315 | -.320 | -.326 | -.327 |
| 330 | -.028 | -.028 | -.028 | -.028 | -.029 | -.029 | .330 | -.322 | -.321 | -.319 |

TABLE VI.-- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(e) $M = 1.20$; $\alpha = 4^\circ$

| x/l | θ , deg | C _{p,t} for - | | | | C _{p,t} for - | | | |
|-------|-------------------|------------------------|---------------------|-------------------|---------------------|------------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| .247 | 0 | 0.254 | 0.236 | 0.222 | 0.205 | 0.180 | 0.043 | -0.036 | -0.073 |
| | 30 | .226 | .215 | .196 | .181 | .159 | .042 | -.045 | -.068 |
| | 45 | .234 | .224 | .204 | .188 | .168 | .042 | -.045 | -.075 |
| | 60 | .243 | .225 | .205 | .193 | .175 | .041 | -.049 | -.081 |
| | 90 | .307 | .303 | .280 | .270 | .257 | .041 | -.049 | -.084 |
| | 120 | .398 | .404 | .372 | .404 | .406 | .041 | -.049 | -.084 |
| | 135 | .312 | .314 | .318 | .308 | .320 | .041 | -.049 | -.084 |
| | 150 | .307 | .312 | .312 | .299 | .312 | .041 | -.049 | -.084 |
| | 180 | .273 | .296 | .293 | .294 | .294 | .041 | -.049 | -.084 |
| | 210 | .271 | .285 | .282 | .286 | .286 | .041 | -.049 | -.084 |
| | 225 | .269 | .283 | .281 | .293 | .283 | .041 | -.049 | -.084 |
| | 240 | .268 | .280 | .281 | .294 | .283 | .041 | -.049 | -.084 |
| | 270 | .228 | .253 | .248 | .195 | .253 | .041 | -.049 | -.084 |
| | 300 | .327 | .331 | .346 | .336 | .305 | .041 | -.049 | -.084 |
| | 315 | .289 | .294 | .309 | .311 | .286 | .041 | -.049 | -.084 |
| | 350 | .261 | .275 | .273 | .273 | .232 | .041 | -.049 | -.084 |
| .709 | 0 | .024 | .029 | .042 | .047 | .047 | .119 | 0 | .024 |
| | 30 | -.019 | -.024 | -.035 | -.034 | -.034 | -.033 | .209 | -.235 |
| | 45 | -.017 | -.022 | -.030 | -.030 | -.030 | -.032 | -.188 | -.247 |
| | 60 | -.026 | -.031 | -.037 | -.036 | -.036 | -.038 | -.213 | -.246 |
| | 90 | -.021 | -.025 | -.034 | -.033 | -.033 | -.032 | -.168 | -.249 |
| | 120 | -.102 | -.099 | -.099 | -.114 | -.113 | -.113 | -.217 | -.249 |
| | 135 | -.298 | -.305 | -.305 | -.305 | -.305 | -.305 | -.190 | -.229 |
| | 150 | -.236 | -.252 | -.255 | -.130 | -.262 | -.262 | -.159 | -.229 |
| | 180 | -.289 | -.297 | -.297 | -.293 | -.296 | -.296 | -.154 | -.229 |
| | 210 | -.297 | -.304 | -.302 | -.304 | -.302 | -.302 | -.175 | -.229 |
| | 225 | --- | --- | -.302 | -.305 | -.305 | -.305 | -.217 | -.229 |
| | 240 | -.255 | -.270 | -.269 | -.268 | -.268 | -.268 | -.203 | -.229 |
| | 270 | -.023 | -.026 | -.026 | -.027 | -.027 | -.027 | -.203 | -.229 |
| | 300 | -.024 | -.021 | -.017 | -.017 | -.021 | -.021 | -.195 | -.229 |
| | 315 | -.022 | -.020 | -.021 | -.020 | -.021 | -.021 | -.195 | -.229 |
| | 350 | -.026 | -.028 | -.028 | -.028 | -.028 | -.028 | -.195 | -.229 |
| .428 | 0 | -.005 | -.017 | -.051 | -.061 | -.061 | .020 | 0 | .020 |
| | 30 | -.000 | -.024 | -.048 | -.049 | -.048 | -.048 | -.255 | -.270 |
| | 45 | -.008 | -.022 | -.041 | -.041 | -.041 | -.041 | -.255 | -.270 |
| | 60 | -.024 | -.039 | -.055 | -.056 | -.056 | -.055 | -.339 | -.341 |
| | 90 | -.026 | -.032 | -.041 | -.037 | -.037 | -.037 | -.339 | -.341 |
| | 120 | -.201 | -.206 | -.253 | -.254 | -.254 | -.254 | -.339 | -.341 |
| | 135 | -.307 | -.314 | -.313 | -.313 | -.313 | -.313 | -.339 | -.341 |
| | 150 | -.306 | -.313 | -.313 | -.313 | -.313 | -.313 | -.339 | -.341 |
| | 180 | -.306 | -.313 | -.313 | -.313 | -.313 | -.313 | -.339 | -.341 |
| | 210 | -.293 | -.300 | -.301 | -.300 | -.300 | -.300 | -.339 | -.341 |
| | 225 | -.201 | -.200 | -.195 | -.200 | -.200 | -.200 | -.339 | -.341 |
| | 240 | -.306 | -.312 | -.303 | -.303 | -.303 | -.303 | -.339 | -.341 |
| | 270 | -.017 | -.016 | -.027 | -.027 | -.027 | -.027 | -.339 | -.341 |
| | 300 | -.014 | -.011 | -.025 | -.025 | -.025 | -.025 | -.339 | -.341 |
| | 315 | -.009 | -.007 | -.025 | -.025 | -.025 | -.025 | -.339 | -.341 |
| | 350 | -.007 | -.010 | -.039 | -.039 | -.039 | -.039 | -.339 | -.341 |

TABLE VI.— PRESSURE COEFFICIENTS FOR SATURN MODEL TANK

WITH SEAL STRIPS ON - Continued

$$(f) M = 1.20; \alpha = 80^\circ$$

| x/l | θ , deg | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
|-------|----------------|------------------|---------------------|-------------------|---------------------|-------------------|
| 0.947 | 0 | 0.296 | 0.231 | 0.187 | 0.112 | 0.089 |
| | 30 | .255 | .199 | .171 | .134 | .115 |
| | 45 | .266 | .221 | .183 | .143 | .123 |
| | 60 | .263 | .219 | .184 | .146 | .126 |
| | 90 | .342 | .273 | .243 | .219 | .205 |
| | 120 | .112 | .112 | .406 | .380 | .420 |
| | 135 | .125 | .131 | .332 | .324 | .336 |
| | 150 | .321 | .329 | .327 | .317 | .325 |
| | 180 | .291 | .310 | .298 | .310 | .300 |
| | 210 | .285 | .301 | .292 | .314 | .297 |
| .709 | 225 | .285 | .299 | .291 | .315 | .295 |
| | 240 | .284 | .295 | .291 | .314 | .294 |
| | 270 | .229 | .262 | .254 | .259 | .259 |
| | 300 | .369 | .357 | .363 | .293 | .247 |
| | 315 | .344 | .312 | .340 | .252 | .211 |
| | 330 | .328 | .290 | .278 | .187 | .155 |
| | 0 | -.015 | -.034 | -.076 | -.116 | -.115 |
| | 30 | -.013 | -.037 | -.077 | -.076 | -.070 |
| | 45 | -.012 | -.028 | -.053 | -.067 | -.067 |
| | 60 | -.024 | -.034 | -.056 | -.072 | -.077 |
| .428 | 90 | -.020 | -.034 | -.056 | -.069 | -.070 |
| | 120 | -.085 | -.095 | -.105 | -.127 | -.131 |
| | 135 | -.314 | -.322 | -.317 | .318 | .319 |
| | 150 | -.238 | -.258 | -.257 | .267 | .267 |
| | 180 | -.303 | -.311 | -.309 | .309 | .308 |
| | 210 | -.312 | -.321 | -.317 | .318 | .317 |
| | 225 | --- | --- | --- | .319 | .318 |
| | 240 | -.280 | -.281 | -.285 | .282 | .282 |
| | 270 | -.020 | -.017 | -.021 | -.021 | -.054 |
| | 300 | -.019 | -.013 | -.012 | -.016 | -.031 |
| .300 | 315 | -.020 | -.015 | -.022 | -.033 | -.039 |
| | 330 | -.020 | -.021 | -.046 | -.072 | -.086 |
| | 0 | -.006 | -.039 | -.092 | -.127 | -.130 |
| | 30 | -.010 | -.049 | -.083 | -.087 | -.079 |
| .105 | 45 | -.006 | -.036 | -.058 | -.065 | -.067 |
| | 60 | -.024 | -.046 | -.067 | -.076 | -.083 |
| | 90 | -.021 | -.039 | -.057 | -.054 | -.060 |
| | 120 | -.248 | -.255 | -.260 | -.274 | -.276 |
| | 135 | -.321 | -.329 | -.326 | -.327 | -.327 |
| | 150 | -.322 | -.330 | -.326 | -.328 | -.327 |
| | 180 | -.322 | -.329 | -.326 | -.328 | -.327 |
| | 210 | -.308 | -.316 | -.314 | -.314 | -.314 |
| | 225 | -.193 | -.198 | -.191 | -.182 | -.199 |
| | 240 | -.320 | -.327 | -.322 | -.319 | -.318 |
| .090 | 270 | -.013 | -.017 | -.019 | -.037 | -.058 |
| | 300 | -.016 | -.013 | -.024 | -.026 | -.029 |
| | 315 | -.010 | -.013 | -.034 | -.051 | -.057 |
| | 330 | -.010 | --- | --- | --- | --- |

| x/l | θ , deg | C _p , t for - | | | | $\phi = 90^\circ$ |
|-------|----------------|--------------------------|---------------------|-------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | |
| 0.250 | 0 | 0.004 | -0.015 | -0.082 | -0.161 | -0.172 |
| | 30 | -0.005 | -0.032 | -0.079 | -0.128 | -0.121 |
| | 45 | -0.006 | -0.028 | -0.062 | -0.103 | -0.131 |
| | 60 | -0.006 | -0.039 | -0.069 | -0.111 | -0.090 |
| | 90 | -0.005 | -0.011 | -0.029 | -0.072 | -0.225 |
| | 120 | -0.165 | -0.178 | -0.187 | -0.215 | -0.331 |
| | 135 | -0.311 | -0.324 | -0.316 | -0.331 | -0.328 |
| | 150 | -0.322 | -0.311 | -0.326 | -0.329 | -0.320 |
| | 180 | -0.304 | -0.322 | -0.329 | -0.330 | -0.330 |
| | 210 | -0.322 | -0.368 | -0.366 | -0.350 | -0.359 |
| .119 | 225 | -0.324 | -0.332 | -0.329 | -0.320 | -0.329 |
| | 240 | -0.203 | -0.211 | -0.215 | -0.210 | -0.231 |
| | 270 | -0.019 | -0.011 | -0.007 | -0.001 | -0.033 |
| | 300 | -0.026 | -0.012 | -0.014 | -0.007 | -0.013 |
| | 315 | -0.016 | -0.005 | -0.020 | -0.037 | -0.047 |
| | 330 | -0.008 | -0.006 | -0.014 | -0.030 | -0.106 |
| | 0 | -0.187 | -0.194 | -0.219 | -0.254 | -0.283 |
| | 30 | -0.168 | -0.229 | -0.282 | -0.313 | -0.297 |
| | 45 | -0.137 | -0.201 | -0.256 | -0.293 | -0.288 |
| | 60 | -0.113 | -0.167 | -0.239 | -0.292 | -0.295 |
| .020 | 90 | -0.093 | -0.146 | -0.225 | -0.280 | -0.279 |
| | 120 | -0.279 | -0.293 | -0.302 | -0.317 | -0.315 |
| | 135 | -0.308 | -0.317 | -0.313 | -0.313 | -0.314 |
| | 150 | -0.244 | -0.334 | -0.350 | -0.351 | -0.351 |
| | 180 | -0.224 | -0.333 | -0.359 | -0.366 | -0.369 |
| | 210 | -0.260 | -0.325 | -0.320 | -0.324 | -0.325 |
| | 225 | -0.231 | -0.332 | -0.327 | -0.328 | -0.327 |
| | 240 | -0.265 | -0.270 | -0.272 | -0.282 | -0.301 |
| | 270 | -0.096 | -0.070 | -0.097 | -0.155 | -0.237 |
| | 300 | -0.113 | -0.079 | -0.095 | -0.142 | -0.220 |
| .330 | 315 | -0.138 | -0.084 | -0.080 | -0.116 | -0.191 |
| | 330 | -0.163 | -0.118 | -0.111 | -0.138 | -0.192 |
| | 0 | -0.255 | -0.214 | -0.268 | -0.302 | -0.323 |
| | 30 | --- | --- | --- | -0.341 | -0.344 |
| | 45 | -0.355 | -0.360 | -0.346 | -0.342 | -0.346 |
| | 60 | -0.371 | -0.373 | -0.354 | -0.344 | -0.346 |
| | 90 | -0.357 | -0.364 | -0.355 | -0.347 | -0.348 |
| | 120 | -0.368 | -0.356 | -0.335 | -0.323 | -0.332 |
| | 135 | -0.325 | -0.325 | -0.321 | -0.321 | -0.321 |
| | 150 | -0.224 | -0.234 | -0.229 | -0.221 | -0.220 |
| .315 | 180 | -0.226 | -0.234 | -0.230 | -0.232 | -0.230 |
| | 210 | -0.225 | -0.234 | -0.230 | -0.233 | -0.231 |
| | 225 | -0.234 | -0.234 | -0.229 | -0.229 | -0.229 |
| | 240 | -0.230 | -0.238 | -0.235 | -0.237 | -0.236 |
| | 270 | -0.247 | -0.255 | -0.250 | -0.253 | -0.252 |
| | 300 | -0.274 | -0.287 | -0.277 | -0.269 | -0.266 |
| | 315 | -0.335 | -0.339 | -0.347 | -0.349 | -0.349 |
| | 330 | -0.315 | -0.315 | -0.323 | -0.323 | -0.323 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(g) $M = 1.50; \alpha = -8^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | | $C_{p,t}$ for - | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 0.947 | 0 | 0.151 | 0.158 | 0.167 | 0.178 | 0.177 | 0.177 | -0.133 | -0.167 |
| | 30 | .129 | .121 | .133 | .135 | .132 | .132 | -.111 | -.116 |
| | 45 | .140 | .125 | .133 | .152 | .161 | .161 | -.063 | -.026 |
| | 60 | .154 | .133 | .116 | .143 | .178 | .178 | -.053 | -.053 |
| | 90 | .195 | .175 | .168 | .194 | .227 | .227 | -.073 | -.073 |
| | 120 | .138 | .138 | .162 | .177 | .357 | .357 | -.016 | -.016 |
| | 135 | .280 | .273 | .288 | .290 | .299 | .299 | -.174 | -.174 |
| | 150 | .276 | .268 | .277 | .281 | .290 | .290 | -.200 | -.200 |
| | 180 | .244 | .259 | .257 | .260 | .257 | .257 | -.286 | -.286 |
| | 210 | .214 | .266 | .253 | .257 | .255 | .255 | -.285 | -.285 |
| .709 | 225 | .244 | .268 | .255 | .254 | .253 | .253 | -.285 | -.285 |
| | 240 | .212 | .261 | .261 | .254 | .255 | .255 | -.206 | -.206 |
| | 270 | .173 | .178 | .149 | .149 | .202 | .202 | -.102 | -.102 |
| | 300 | .221 | .200 | .203 | .184 | .203 | .203 | -.135 | -.135 |
| | 315 | .211 | .174 | .173 | .185 | .175 | .175 | -.123 | -.123 |
| | 330 | .188 | .165 | .171 | .184 | .181 | .181 | -.124 | -.124 |
| | 0 | .005 | .009 | .031 | .031 | .072 | .072 | -.119 | -.119 |
| | 30 | -.006 | -.006 | -.015 | -.015 | -.062 | -.077 | 0 | 0 |
| | 45 | -.005 | -.005 | -.056 | -.056 | -.062 | -.077 | -.138 | -.138 |
| | 60 | -.017 | -.017 | -.055 | -.055 | -.062 | -.077 | -.127 | -.127 |
| .428 | 90 | -.017 | -.017 | -.047 | -.047 | -.062 | -.077 | -.120 | -.120 |
| | 120 | -.113 | -.105 | -.132 | -.131 | -.131 | -.131 | -.124 | -.124 |
| | 135 | -.269 | -.272 | -.275 | -.279 | -.277 | -.277 | -.242 | -.242 |
| | 150 | -.138 | -.086 | -.082 | -.087 | -.189 | -.189 | -.259 | -.259 |
| | 180 | -.261 | -.263 | -.266 | -.269 | -.267 | -.267 | -.284 | -.284 |
| | 210 | -.266 | -.270 | -.272 | -.277 | -.276 | -.276 | -.286 | -.286 |
| | 225 | --- | --- | --- | --- | --- | --- | -.280 | -.280 |
| | 240 | -.226 | -.232 | -.232 | -.245 | -.245 | -.245 | -.284 | -.284 |
| | 270 | -.013 | -.004 | -.015 | -.013 | -.054 | -.054 | -.097 | -.097 |
| | 300 | -.008 | -.004 | -.022 | -.020 | -.045 | -.045 | -.116 | -.116 |
| .167 | 315 | -.006 | -.005 | -.020 | -.019 | -.066 | -.066 | -.088 | -.088 |
| | 330 | -.008 | -.010 | -.021 | -.019 | -.045 | -.045 | -.118 | -.118 |
| | 0 | .051 | .055 | .050 | .082 | .118 | .118 | -.102 | -.102 |
| | 30 | .030 | .029 | .010 | .043 | .076 | .099 | 0 | 0 |
| | 45 | .022 | .022 | .010 | .013 | .032 | .048 | -.222 | -.222 |
| | 60 | .033 | .038 | .051 | .074 | .092 | .099 | -.292 | -.292 |
| | 90 | .036 | .051 | .061 | .074 | .091 | .099 | -.304 | -.304 |
| | 120 | .226 | .234 | .245 | .244 | .229 | .229 | -.303 | -.303 |
| | 135 | .275 | .279 | .280 | .285 | .282 | .282 | -.291 | -.291 |
| | 150 | .276 | .280 | .282 | .287 | .287 | .287 | -.287 | -.287 |
| .071 | 180 | .277 | .280 | .282 | .287 | .285 | .285 | -.286 | -.286 |
| | 210 | .261 | .265 | .267 | .271 | .268 | .268 | -.285 | -.285 |
| | 225 | .187 | .188 | .187 | .187 | .197 | .197 | -.285 | -.285 |
| | 240 | .275 | .277 | .278 | .278 | .274 | .274 | -.290 | -.290 |
| | 270 | .059 | .056 | .055 | .055 | .053 | .053 | -.287 | -.287 |
| | 300 | .034 | .036 | .047 | .047 | .053 | .053 | -.296 | -.296 |
| | 315 | .032 | .036 | .047 | .047 | .055 | .055 | -.276 | -.276 |
| | 330 | .033 | .036 | .044 | .044 | .056 | .056 | -.296 | -.296 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(h) $M = 1.30; \alpha = -1^\circ$

| x/l | θ, deg | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $C_{p,t} \text{ for } \phi = 0^\circ$ | x/l | θ, deg | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | |
|-------|----------------------|------------------|---------------------|-------------------|---------------------|-------------------|---------------------------------------|-------|----------------------|------------------|---------------------|-------------------|---------------------|-------------------|--------|
| 0.947 | 0 | 0.152 | 0.154 | 0.169 | 0.193 | 0.212 | 0.250 | 0 | 30 | -0.063 | -0.064 | -0.067 | -0.076 | -0.077 | |
| | 45 | .136 | .142 | .155 | .169 | .182 | | .45 | -0.060 | -0.061 | -0.061 | -0.066 | -0.069 | -0.053 | |
| | 60 | .149 | .157 | .171 | .182 | .196 | | .60 | -0.058 | -0.058 | -0.054 | -0.052 | -0.051 | -0.046 | |
| | 90 | .161 | .172 | .171 | .182 | .196 | | .90 | -0.064 | -0.064 | -0.070 | -0.067 | -0.067 | -0.056 | |
| | 120 | .194 | .213 | .228 | .244 | .263 | | .120 | -0.168 | -0.173 | -0.179 | -0.176 | -0.176 | -0.167 | |
| | 135 | .234 | .228 | .235 | .247 | .247 | | .135 | -0.257 | -0.263 | -0.261 | -0.273 | -0.273 | -0.273 | |
| | 150 | .273 | .264 | .275 | .275 | .267 | | .150 | -0.268 | -0.270 | -0.270 | -0.270 | -0.271 | -0.271 | |
| | 170 | .267 | .258 | .268 | .268 | .267 | | .170 | -0.272 | -0.274 | -0.274 | -0.274 | -0.273 | -0.273 | |
| | 180 | .236 | .250 | .248 | .249 | .247 | | .180 | -0.272 | -0.270 | -0.268 | -0.270 | -0.273 | -0.273 | |
| | 210 | .235 | .235 | .255 | .242 | .244 | | .210 | -0.270 | -0.272 | -0.274 | -0.274 | -0.273 | -0.273 | |
| | 225 | .235 | .235 | .256 | .242 | .242 | | .225 | -0.272 | -0.271 | -0.271 | -0.271 | -0.273 | -0.273 | |
| | 240 | .234 | .234 | .251 | .242 | .241 | | .240 | -0.174 | -0.174 | -0.176 | -0.176 | -0.176 | -0.186 | |
| | 270 | .179 | .195 | .195 | .169 | .166 | | .270 | -0.066 | -0.063 | -0.062 | -0.065 | -0.066 | -0.066 | |
| | 300 | .221 | .203 | .203 | .203 | .222 | | .300 | -0.065 | -0.066 | -0.078 | -0.085 | -0.083 | -0.083 | |
| | 315 | .180 | .159 | .170 | .196 | .217 | | .330 | -0.063 | -0.063 | -0.076 | -0.081 | -0.077 | -0.076 | |
| | 330 | | | | | | | | | | -0.065 | -0.070 | -0.074 | -0.070 | -0.070 |
| .709 | 0 | .015 | .019 | .023 | .023 | .037 | .119 | 0 | .158 | -0.159 | -0.166 | -0.166 | -0.168 | -0.168 | |
| | 45 | .012 | .016 | .016 | .020 | .029 | | .30 | -0.140 | -0.145 | -0.145 | -0.145 | -0.148 | -0.148 | |
| | 60 | .018 | .026 | .013 | .013 | .018 | | .45 | -0.128 | -0.128 | -0.133 | -0.133 | -0.136 | -0.142 | |
| | 90 | .017 | .029 | .029 | .028 | .028 | | .60 | -0.131 | -0.131 | -0.146 | -0.146 | -0.148 | -0.158 | |
| | 120 | .113 | .098 | .098 | .107 | .106 | | .90 | -0.134 | -0.134 | -0.147 | -0.147 | -0.148 | -0.148 | |
| | 135 | .261 | .261 | .261 | .264 | .264 | | .120 | -0.237 | -0.237 | -0.245 | -0.245 | -0.246 | -0.246 | |
| | 150 | .145 | .118 | .118 | .116 | .116 | | .155 | -0.252 | -0.252 | -0.254 | -0.254 | -0.256 | -0.256 | |
| | 180 | .252 | .253 | .256 | .256 | .254 | | .150 | -0.272 | -0.272 | -0.274 | -0.274 | -0.274 | -0.273 | |
| | 210 | .258 | .260 | .263 | .263 | .262 | | .180 | -0.270 | -0.271 | -0.271 | -0.271 | -0.272 | -0.272 | |
| | 225 | | | | | | | .210 | -0.268 | -0.272 | -0.273 | -0.273 | -0.268 | -0.267 | |
| | 240 | | | | | | | .225 | -0.267 | -0.268 | -0.270 | -0.270 | -0.269 | -0.269 | |
| | 270 | .016 | .015 | .015 | .020 | .028 | | .240 | -0.212 | -0.212 | -0.214 | -0.214 | -0.215 | -0.215 | |
| | 300 | .013 | .018 | .018 | .021 | .028 | | .270 | -0.131 | -0.131 | -0.140 | -0.140 | -0.141 | -0.141 | |
| | 315 | .012 | .012 | .017 | .020 | .028 | | .300 | -0.151 | -0.151 | -0.168 | -0.168 | -0.170 | -0.170 | |
| | 330 | .016 | .016 | .022 | .023 | .031 | | .330 | -0.131 | -0.131 | -0.143 | -0.143 | -0.145 | -0.145 | |
| .428 | 0 | .034 | .038 | .037 | .050 | .051 | .020 | 0 | .210 | -0.217 | -0.234 | -0.234 | -0.236 | -0.233 | |
| | 45 | .032 | .033 | .034 | .044 | .042 | | .30 | -0.282 | -0.282 | -0.285 | -0.285 | -0.286 | -0.283 | |
| | 60 | .033 | .022 | .022 | .024 | .024 | | .45 | -0.300 | -0.293 | -0.293 | -0.293 | -0.292 | -0.293 | |
| | 90 | .036 | .038 | .038 | .027 | .027 | | .60 | -0.294 | -0.294 | -0.294 | -0.294 | -0.296 | -0.302 | |
| | 120 | .184 | .220 | .220 | .224 | .224 | | .90 | -0.275 | -0.275 | -0.275 | -0.275 | -0.275 | -0.275 | |
| | 135 | .263 | .268 | .268 | .270 | .270 | | .120 | -0.273 | -0.273 | -0.275 | -0.275 | -0.274 | -0.274 | |
| | 180 | .267 | .268 | .268 | .270 | .270 | | .150 | -0.272 | -0.272 | -0.274 | -0.274 | -0.275 | -0.275 | |
| | 210 | .256 | .254 | .256 | .256 | .256 | | .180 | -0.271 | -0.271 | -0.274 | -0.274 | -0.274 | -0.274 | |
| | 225 | .184 | .185 | .181 | .182 | .182 | | .210 | -0.273 | -0.273 | -0.275 | -0.275 | -0.274 | -0.274 | |
| | 240 | .266 | .268 | .268 | .264 | .264 | | .240 | -0.278 | -0.278 | -0.278 | -0.278 | -0.278 | -0.278 | |
| | 270 | .039 | .039 | .039 | .037 | .037 | | .270 | -0.288 | -0.288 | -0.290 | -0.290 | -0.289 | -0.289 | |
| | 300 | .034 | .038 | .038 | .048 | .048 | | .300 | -0.302 | -0.302 | -0.312 | -0.312 | -0.301 | -0.294 | |
| | 315 | .033 | .037 | .039 | .045 | .045 | | .315 | -0.266 | -0.266 | -0.275 | -0.275 | -0.273 | -0.273 | |
| | 330 | .035 | .039 | .038 | .045 | .045 | | .330 | -0.255 | -0.255 | -0.263 | -0.263 | -0.276 | -0.276 | |

TABLE VI. - PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(1) $M = 1.30; \alpha = 0^\circ$

| x/l | $\theta,$ deg | $C_{p,t}$ for - | | | | θ, deg | x/l | $C_{p,t}$ for - | | | |
|-------|------------------|------------------|---------------------|-------------------|---------------------|---------------|-------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 0.947 | 0 | 0.197 | 0.188 | 0.188 | 0.187 | 0.188 | 0.290 | 0 | -0.054 | -0.052 | -0.051 |
| | 30 | .180 | .169 | .171 | .168 | .169 | | .30 | -0.053 | -0.053 | -0.055 |
| | 45 | .189 | .179 | .181 | .178 | .180 | | .45 | -0.054 | -0.052 | -0.053 |
| | 60 | .198 | .188 | .191 | .188 | .192 | | .60 | -0.052 | -0.050 | -0.049 |
| | 90 | .236 | .228 | .233 | .229 | .230 | | .90 | -0.056 | -0.054 | -0.054 |
| | 120 | .359 | .321 | .342 | .343 | .343 | | .120 | -0.161 | -0.166 | -0.163 |
| | 135 | .271 | .266 | .274 | .276 | .277 | | .135 | -0.252 | -0.257 | -0.269 |
| | 150 | .265 | .260 | .266 | .269 | .268 | | .150 | -0.263 | -0.266 | -0.267 |
| | 180 | .232 | .252 | .247 | .251 | .248 | | .180 | -0.265 | -0.269 | -0.270 |
| | 210 | .231 | .255 | .240 | .245 | .243 | | .210 | -0.263 | -0.266 | -0.269 |
| | 225 | .250 | .256 | .259 | .259 | .259 | | .225 | -0.264 | -0.269 | -0.270 |
| | 240 | .250 | .251 | .259 | .251 | .242 | | .240 | -0.167 | -0.169 | -0.180 |
| | 270 | .155 | .204 | .182 | .184 | .184 | | .270 | -0.059 | -0.060 | -0.059 |
| | 300 | .262 | .257 | .261 | .258 | .259 | | .300 | -0.058 | -0.058 | -0.052 |
| | 315 | .233 | .226 | .228 | .230 | .230 | | .315 | -0.056 | -0.056 | -0.049 |
| | 330 | .216 | .211 | .214 | .213 | .214 | | .330 | -0.055 | -0.054 | -0.050 |
| .709 | 0 | .019 | .021 | .017 | .023 | .020 | .119 | 0 | -0.192 | -0.187 | -0.188 |
| | 30 | -.015 | -.019 | -.014 | -.011 | -.017 | | .30 | -.170 | -.167 | -.164 |
| | 45 | -.012 | -.015 | -.011 | -.019 | -.014 | | .45 | -.152 | -.152 | -.143 |
| | 60 | -.019 | -.022 | -.019 | -.027 | -.021 | | .60 | -.147 | -.142 | -.143 |
| | 90 | -.017 | -.019 | -.018 | -.026 | -.018 | | .90 | -.145 | -.140 | -.135 |
| | 120 | -.108 | -.096 | -.105 | -.107 | -.109 | | .120 | -.236 | -.239 | -.236 |
| | 135 | .255 | .260 | .260 | .262 | .260 | | .135 | -.246 | -.250 | -.251 |
| | 150 | .118 | .139 | .138 | .173 | .152 | | .150 | -.267 | -.270 | -.271 |
| | 180 | .247 | .251 | .251 | .254 | .252 | | .180 | -.265 | -.269 | -.268 |
| | 210 | .252 | .258 | .258 | .260 | .260 | | .210 | -.262 | -.269 | -.266 |
| | 225 | ----- | ----- | ----- | ----- | ----- | | .225 | -.262 | -.266 | -.266 |
| | 240 | .213 | .219 | .218 | .224 | .220 | | .240 | -.217 | -.220 | -.223 |
| | 270 | -.016 | -.020 | -.017 | -.020 | -.018 | | .270 | -.150 | -.138 | -.143 |
| | 300 | -.016 | -.018 | -.016 | -.019 | -.018 | | .300 | -.150 | -.141 | -.144 |
| | 315 | -.015 | -.017 | -.014 | -.018 | -.016 | | .315 | -.155 | -.150 | -.154 |
| | 330 | -.020 | -.022 | -.020 | -.025 | -.022 | | .330 | -.170 | -.165 | -.164 |
| .428 | 0 | .031 | .034 | .034 | .034 | .034 | .020 | 0 | -.222 | -.219 | -.223 |
| | 30 | -.030 | -.033 | -.032 | -.032 | -.032 | | .30 | ----- | ----- | ----- |
| | 45 | -.024 | -.025 | -.023 | -.023 | -.027 | | .45 | -.290 | -.291 | -.294 |
| | 60 | -.035 | -.036 | -.034 | -.034 | -.039 | | .60 | -.304 | -.305 | -.306 |
| | 90 | -.035 | -.037 | -.034 | -.034 | -.037 | | .90 | -.299 | -.302 | -.307 |
| | 120 | .215 | .215 | .217 | .217 | .215 | | .120 | -.268 | -.272 | -.274 |
| | 135 | .262 | .266 | .267 | .268 | .267 | | .135 | -.266 | -.271 | -.273 |
| | 150 | .263 | .266 | .267 | .268 | .267 | | .150 | -.264 | -.271 | -.271 |
| | 180 | .265 | .266 | .267 | .268 | .267 | | .180 | -.265 | -.269 | -.270 |
| | 210 | .248 | .251 | .252 | .254 | .252 | | .210 | -.267 | -.270 | -.271 |
| | 225 | -.177 | -.182 | -.182 | -.180 | -.179 | | .225 | -.264 | -.271 | -.272 |
| | 240 | -.261 | -.264 | -.261 | -.259 | -.261 | | .240 | -.272 | -.276 | -.277 |
| | 270 | -.055 | -.056 | -.055 | -.056 | -.055 | | .270 | -.289 | -.291 | -.293 |
| | 300 | -.052 | -.054 | -.053 | -.054 | -.053 | | .300 | -.309 | -.313 | -.312 |
| | 315 | -.050 | -.052 | -.051 | -.052 | -.051 | | .315 | -.315 | -.314 | -.312 |
| | 330 | -.052 | -.053 | -.052 | -.053 | -.052 | | .330 | -.270 | -.278 | -.275 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL TANK
WITH SEAL STRIPS ON - Continued

(J) M = 1.30; $\alpha = 4^\circ$

| x/l | θ_1 deg | C _{p,t} for - | | | | C _{p,t} for - | | | |
|-------|-------------------|------------------------|---------------------|-------------------|---------------------|------------------------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 0.947 | 0 | 0.210 | 0.221 | 0.212 | 0.191 | 0.178 | -0.037 | -0.056 | -0.080 |
| | 45 | .214 | .197 | .185 | .171 | .158 | -.047 | -.057 | -.074 |
| | 60 | .223 | .203 | .193 | .174 | .163 | -.045 | -.048 | -.062 |
| | 90 | .287 | .203 | .190 | .175 | .168 | -.040 | -.052 | -.065 |
| | 120 | -.343 | -.321 | .262 | .246 | .242 | -.043 | -.046 | -.055 |
| | 135 | -.270 | -.266 | -.348 | -.321 | -.354 | -.154 | -.158 | -.170 |
| | 150 | -.267 | -.261 | -.272 | -.276 | -.281 | -.276 | -.263 | -.275 |
| | 180 | -.234 | -.251 | -.247 | -.250 | -.249 | -.245 | -.271 | -.271 |
| | 210 | -.233 | -.251 | -.259 | -.244 | -.245 | -.245 | -.267 | -.274 |
| | 225 | -.231 | -.251 | -.259 | -.243 | -.243 | -.243 | -.271 | -.274 |
| | 240 | -.251 | -.251 | -.258 | -.243 | -.244 | -.244 | -.165 | -.184 |
| | 270 | -.179 | -.209 | -.189 | -.172 | -.157 | -.157 | -.046 | -.056 |
| | 300 | .313 | .305 | .337 | .318 | .293 | .300 | -.047 | -.051 |
| | 315 | .279 | .272 | .294 | .294 | .276 | .315 | -.043 | -.056 |
| | 330 | .270 | .253 | .262 | .249 | .225 | .330 | -.040 | -.048 |
| .709 | 0 | -.017 | -.023 | -.034 | -.047 | -.046 | -.119 | 0 | -.204 |
| | 45 | -.014 | -.021 | -.028 | -.035 | -.035 | .30 | -.169 | -.225 |
| | 60 | -.023 | -.029 | -.025 | -.031 | -.034 | .45 | -.148 | -.200 |
| | 90 | -.020 | -.025 | -.029 | -.035 | -.037 | .60 | -.139 | -.194 |
| | 120 | -.098 | -.077 | -.082 | -.082 | -.089 | .90 | -.131 | -.179 |
| | 135 | -.258 | -.262 | -.261 | -.265 | -.265 | 120 | -.237 | -.250 |
| | 150 | -.151 | -.156 | -.161 | -.118 | -.109 | 135 | -.251 | -.255 |
| | 180 | -.252 | -.252 | -.256 | -.257 | -.257 | 150 | -.270 | -.275 |
| | 210 | -.256 | -.260 | -.262 | -.264 | -.264 | 180 | -.269 | -.270 |
| | 225 | --- | --- | --- | --- | --- | 210 | -.266 | -.271 |
| | 240 | -.224 | -.227 | -.232 | -.238 | -.236 | 225 | -.266 | -.267 |
| | 270 | -.016 | -.018 | -.020 | -.032 | -.036 | 240 | -.217 | -.216 |
| | 300 | -.017 | -.015 | -.015 | -.022 | -.021 | 270 | -.135 | -.130 |
| | 315 | -.014 | -.013 | -.018 | -.026 | -.022 | 300 | -.141 | -.128 |
| | 330 | -.019 | -.020 | -.028 | -.042 | -.041 | 315 | -.151 | -.132 |
| .428 | 0 | -.030 | -.037 | -.052 | -.058 | -.060 | 330 | -.170 | -.153 |
| | 45 | -.023 | -.029 | -.043 | -.047 | -.047 | 270 | -.209 | -.217 |
| | 60 | -.036 | -.043 | -.053 | -.059 | -.055 | 300 | 0 | -.235 |
| | 90 | -.033 | -.033 | -.043 | -.047 | -.047 | 315 | -.200 | -.275 |
| | 120 | -.214 | -.214 | -.217 | -.221 | -.221 | 330 | -.292 | -.298 |
| | 135 | -.266 | -.268 | -.271 | -.272 | -.272 | 300 | -.292 | -.295 |
| | 150 | -.266 | -.268 | -.268 | -.271 | -.272 | 315 | -.295 | -.295 |
| | 180 | -.266 | -.268 | -.268 | -.271 | -.272 | 330 | -.308 | -.313 |
| | 210 | -.251 | -.253 | -.253 | -.257 | -.258 | 300 | -.276 | -.275 |
| | 225 | -.175 | -.176 | -.175 | -.179 | -.180 | 315 | -.276 | -.275 |
| | 240 | -.265 | -.265 | -.264 | -.264 | -.264 | 330 | -.276 | -.276 |
| | 270 | -.053 | -.053 | -.051 | -.057 | -.057 | 300 | -.295 | -.295 |
| | 300 | -.053 | -.053 | -.053 | -.057 | -.057 | 315 | -.315 | -.315 |
| | 315 | -.031 | -.029 | -.032 | -.048 | -.048 | 330 | -.267 | -.267 |
| | 330 | -.032 | -.035 | -.031 | -.040 | -.040 | | -.268 | -.271 |

TABLE VI.- PRESSURE COEFFICIENTS FOR SATURN MODEL, TANK

WITH SEAL STRIPS ON - Concluded

(k) $M = 1.30; \alpha = 8^\circ$

| x/l | θ, deg | $C_{p,t} \text{ for } \phi = 0^\circ$ | | | | $C_{p,t} \text{ for } \phi = 45^\circ$ | | | | $C_{p,t} \text{ for } \phi = 67.5^\circ$ | | | | $C_{p,t} \text{ for } \phi = 90^\circ$ | | | |
|-------|----------------------|---------------------------------------|---------------------|-------------------|---------------------|--|------------------|---------------------|-------------------|--|-------------------|------------------|---------------------|--|---------------------|-------------------|--|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | |
| 0.947 | 0 | 0.274 | 0.218 | 0.176 | 0.102 | 0.084 | 0.250 | 0 | 0.009 | -0.020 | -0.098 | 0.196 | 0 | -0.098 | -0.171 | -0.175 | |
| | 30 | .233 | .190 | .160 | .121 | .113 | | .30 | .000 | -.007 | -.028 | -.083 | .30 | -.003 | -.133 | -.132 | |
| | 45 | .239 | .203 | .165 | .126 | .113 | | .45 | -.007 | -.008 | -.030 | -.067 | .45 | -.008 | -.112 | -.126 | |
| | 60 | .236 | .195 | .165 | .128 | .116 | | .60 | -.010 | -.016 | -.043 | -.076 | .60 | -.016 | -.121 | -.136 | |
| | 90 | .311 | .251 | .220 | .193 | .185 | | .90 | -.010 | -.016 | -.043 | -.085 | .90 | -.016 | -.121 | -.136 | |
| | 120 | .354 | .322 | .355 | .363 | .367 | | 120 | -.135 | -.151 | -.166 | -.197 | 120 | -.135 | -.204 | -.204 | |
| | 135 | .279 | .294 | .287 | .294 | .293 | | 135 | -.268 | -.282 | -.273 | -.293 | 135 | -.268 | -.288 | -.288 | |
| | 150 | .274 | .282 | .282 | .288 | .284 | | 150 | -.278 | -.288 | -.283 | -.290 | 150 | -.278 | -.285 | -.285 | |
| | 180 | .245 | .271 | .262 | .264 | .261 | | 180 | -.281 | -.289 | -.286 | -.292 | 180 | -.281 | -.288 | -.288 | |
| | 210 | .246 | .277 | .256 | .261 | .261 | | 210 | -.279 | -.285 | -.283 | -.292 | 210 | -.279 | -.286 | -.286 | |
| | 225 | .247 | .272 | .254 | .260 | .262 | | 225 | -.281 | -.289 | -.286 | -.292 | 225 | -.281 | -.286 | -.286 | |
| | 240 | .245 | .275 | .254 | .260 | .258 | | 240 | -.160 | -.168 | -.173 | -.176 | 240 | -.160 | -.192 | -.192 | |
| | 270 | .182 | .217 | .201 | .194 | .194 | | 270 | -.016 | -.016 | -.016 | -.015 | 270 | -.016 | -.045 | -.045 | |
| | 300 | .359 | .342 | .367 | .374 | .374 | | 300 | -.021 | -.020 | -.019 | -.019 | 300 | -.021 | -.028 | -.028 | |
| | 315 | .332 | .300 | .323 | .324 | .301 | | 315 | -.009 | -.017 | -.030 | -.050 | 315 | -.009 | -.057 | -.057 | |
| | 350 | .312 | .274 | .261 | .171 | .148 | | 350 | -.002 | -.017 | -.061 | -.090 | 350 | -.002 | -.111 | -.111 | |
| | .709 | 0 | .011 | .051 | .071 | .122 | | .119 | 0 | .167 | .173 | .194 | .194 | 0 | .194 | .254 | |
| | | 30 | .010 | .056 | .064 | .083 | | .072 | .072 | .153 | .212 | .284 | .284 | .30 | .284 | .264 | |
| | | 45 | .009 | .027 | .050 | .074 | | .068 | .068 | .185 | .236 | .256 | .256 | .45 | .256 | .215 | |
| | | 60 | .019 | .050 | .054 | .078 | | .076 | .076 | .146 | .216 | .253 | .253 | .60 | .253 | .251 | |
| | | 90 | .019 | .032 | .059 | .077 | | .068 | .068 | .123 | .198 | .242 | .242 | .90 | .198 | .234 | |
| | | 120 | .072 | .093 | .102 | .102 | | .116 | .116 | .257 | .257 | .279 | .279 | .120 | .279 | .271 | |
| | | 135 | .271 | .291 | .277 | .282 | | .278 | .278 | .261 | .272 | .269 | .272 | .135 | .266 | .266 | |
| | | 150 | .159 | .169 | .179 | .179 | | .153 | .153 | .281 | .292 | .294 | .294 | .150 | .294 | .286 | |
| | | 180 | .262 | .271 | .268 | .273 | | .268 | .268 | .279 | .291 | .286 | .290 | .180 | .286 | .285 | |
| | | 210 | .269 | .279 | .275 | .282 | | .276 | .276 | .278 | .290 | .288 | .288 | .210 | .288 | .281 | |
| | | 225 | .271 | .282 | .277 | .282 | | .277 | .277 | .277 | .287 | .284 | .284 | .225 | .282 | .282 | |
| | | 240 | .242 | .248 | .251 | .247 | | .247 | .247 | .216 | .228 | .240 | .240 | .240 | .228 | .255 | |
| | | 270 | .017 | .014 | .019 | .029 | | .058 | .058 | .079 | .049 | .081 | .081 | .270 | .136 | .206 | |
| | | 300 | .016 | .011 | .011 | .024 | | .040 | .040 | .096 | .060 | .079 | .079 | .300 | .123 | .190 | |
| | | 315 | .012 | .008 | .019 | .043 | | .052 | .052 | .123 | .071 | .067 | .067 | .315 | .101 | .168 | |
| | | 350 | .017 | .018 | .043 | .080 | | .094 | .094 | .150 | .103 | .097 | .097 | .350 | .122 | .166 | |
| | .428 | 0 | .014 | .057 | .086 | .155 | | .157 | .157 | .183 | .196 | .224 | .224 | .0 | .196 | .254 | |
| | | 30 | .017 | .047 | .081 | .097 | | .083 | .083 | .254 | --- | --- | --- | .30 | --- | .302 | |
| | | 45 | .008 | .032 | .054 | .073 | | .069 | .069 | .307 | .312 | .297 | .297 | .45 | .312 | .304 | |
| | | 60 | .024 | .042 | .065 | .085 | | .086 | .086 | .322 | .325 | .301 | .301 | .60 | .325 | .304 | |
| | | 90 | .019 | .036 | .055 | .065 | | .064 | .064 | .311 | .317 | .308 | .308 | .90 | .311 | .304 | |
| | | 120 | .212 | .221 | .228 | .244 | | .243 | .243 | .284 | .294 | .291 | .291 | .120 | .291 | .289 | |
| | | 135 | .267 | .267 | .284 | .289 | | .283 | .283 | .281 | .293 | .288 | .288 | .135 | .287 | .287 | |
| | | 150 | .278 | .288 | .284 | .289 | | .285 | .285 | .281 | .291 | .287 | .287 | .150 | .292 | .285 | |
| | | 180 | .279 | .269 | .298 | .298 | | .290 | .290 | .281 | .291 | .287 | .287 | .180 | .287 | .286 | |
| | | 210 | .264 | .273 | .270 | .274 | | .271 | .271 | .281 | .292 | .288 | .288 | .210 | .288 | .285 | |
| | | 225 | .167 | .173 | .163 | .168 | | .179 | .179 | .280 | .291 | .292 | .292 | .225 | .292 | .292 | |
| | | 240 | .277 | .261 | .281 | .282 | | .276 | .276 | .240 | .286 | .293 | .293 | .240 | .293 | .288 | |
| | | 270 | .018 | .013 | .017 | .042 | | .061 | .061 | .270 | .298 | .305 | .305 | .270 | .305 | .301 | |
| | | 300 | .020 | .012 | .019 | .031 | | .037 | .037 | .300 | .321 | .338 | .338 | .300 | .338 | .304 | |
| | | 315 | .015 | .010 | .028 | .059 | | .067 | .067 | .315 | .328 | .349 | .349 | .315 | .349 | .304 | |
| | | 350 | .017 | .018 | .047 | .096 | | .115 | .115 | .350 | .363 | .372 | .372 | .350 | .372 | .303 | |

TABLE VII.- SECTION NORMAL-FORCE COEFFICIENTS FOR
SATURN MODEL WITH SEAL STRIPS OFF

| x/l | c _n for - | | | |
|-------|----------------------|--------------------|--------------------|--------------------|
| | M = 1.20 | | M = 1.30 | |
| | $\alpha = 4^\circ$ | $\alpha = 8^\circ$ | $\alpha = 4^\circ$ | $\alpha = 8^\circ$ |
| 0.025 | 0.078 | 0.149 | 0.068 | 0.163 |
| .041 | .085 | .169 | .084 | .181 |
| .057 | .093 | .184 | .085 | .188 |
| .078 | .087 | .175 | .094 | .189 |
| .098 | .086 | .167 | .096 | .177 |
| .110 | .083 | .159 | .098 | .175 |
| .118 | .033 | .063 | .044 | .078 |
| .130 | .046 | .099 | .055 | .096 |
| .142 | .049 | .105 | .049 | .095 |
| .155 | .045 | .085 | .045 | .080 |
| .167 | .032 | .063 | .031 | .065 |
| .179 | ---- | ---- | ---- | ---- |
| .191 | -.039 | -.140 | .012 | .014 |
| .224 | .110 | .193 | .057 | .092 |
| .232 | .164 | .289 | .138 | .232 |
| .248 | .140 | .225 | .116 | .183 |
| .264 | .086 | .161 | .081 | .145 |
| .280 | .080 | .155 | .081 | .146 |
| .297 | .084 | .161 | .080 | .158 |
| .321 | .095 | .156 | .097 | .167 |
| .329 | .028 | .057 | .035 | .066 |
| .337 | .019 | .053 | .029 | .061 |
| .365 | ---- | ---- | ---- | ---- |
| .398 | .049 | .109 | .040 | .083 |
| .442 | -.025 | -.127 | .017 | -.009 |
| .491 | .077 | .186 | .065 | .148 |
| .499 | .081 | .208 | .067 | .158 |
| .503 | .090 | .228 | .076 | .166 |
| .507 | .138 | .314 | .117 | .251 |
| .511 | .186 | .387 | .168 | .341 |
| .515 | .485 | .403 | .207 | .396 |
| .519 | ---- | ---- | ---- | ---- |
| .523 | .205 | .316 | .218 | .346 |
| .529 | -.014 | -.087 | -.003 | -.058 |
| .538 | -.040 | -.081 | -.020 | -.026 |
| .567 | .005 | .011 | .006 | .011 |
| .602 | .008 | .015 | .010 | .013 |
| .648 | .010 | .023 | .011 | .013 |
| .711 | -.001 | -.009 | .002 | -.013 |
| .810 | -.016 | -.033 | -.008 | -.031 |
| .894 | .071 | .103 | .055 | .079 |
| .970 | .198 | .289 | .174 | .238 |
| .976 | .189 | .281 | .179 | .248 |
| .982 | .164 | .247 | .158 | .226 |
| .988 | .150 | .232 | .145 | .214 |
| .996 | .132 | .215 | .123 | .198 |

TABLE VIII.- SECTION NORMAL-FORCE COEFFICIENTS FOR
SATURN MODEL WITH SEAL STRIPS ON

| x/l | c _n for - | | | |
|-------|----------------------|--------------------|--------------------|--------------------|
| | M = 1.20 | | M = 1.30 | |
| | $\alpha = 4^\circ$ | $\alpha = 8^\circ$ | $\alpha = 4^\circ$ | $\alpha = 8^\circ$ |
| 0.025 | 0.071 | 0.063 | 0.075 | 0.174 |
| .041 | .085 | .168 | .091 | .185 |
| .057 | .094 | .187 | .094 | .180 |
| .078 | .087 | .174 | .094 | .178 |
| .098 | .079 | .166 | .088 | .168 |
| .110 | .080 | .159 | .091 | .178 |
| .118 | .030 | .059 | .042 | .081 |
| .130 | .046 | .097 | .049 | .097 |
| .142 | .047 | .095 | .045 | .095 |
| .155 | .038 | .082 | .036 | .076 |
| .167 | .029 | .062 | .030 | .061 |
| .179 | .017 | .024 | .019 | .042 |
| .191 | -.037 | -.136 | .010 | .012 |
| .224 | .106 | .195 | .049 | .085 |
| .232 | .163 | .291 | .130 | .239 |
| .248 | .138 | .219 | .112 | .176 |
| .264 | .083 | .159 | .077 | .144 |
| .280 | .077 | .153 | .070 | .149 |
| .297 | .082 | .158 | .076 | .161 |
| .321 | .090 | .150 | .092 | .164 |
| .329 | .023 | .056 | .036 | .068 |
| .337 | .016 | .051 | .026 | .060 |
| .365 | .046 | .114 | .037 | .082 |
| .398 | .049 | .112 | .037 | .076 |
| .442 | -.014 | -.131 | .019 | .018 |
| .491 | .074 | .190 | .064 | .149 |
| .499 | .079 | .211 | .066 | .159 |
| .503 | .089 | .233 | .073 | .171 |
| .507 | .136 | .319 | .115 | .255 |
| .511 | .185 | .385 | .165 | .345 |
| .515 | .219 | .400 | .207 | .401 |
| .519 | ---- | ---- | ---- | ---- |
| .523 | .207 | .312 | .218 | .352 |
| .529 | -.022 | -.096 | .002 | -.051 |
| .538 | -.043 | -.083 | -.018 | -.022 |
| .567 | .008 | .023 | .008 | .021 |
| .602 | .045 | -.009 | -.014 | -.012 |
| .648 | .012 | .026 | .017 | .016 |
| .711 | .006 | -.016 | -.004 | -.016 |
| .810 | -.018 | -.038 | -.006 | -.027 |
| .894 | .054 | .047 | .053 | .036 |
| .970 | .191 | .283 | .158 | .238 |
| .976 | .180 | .271 | .163 | .243 |
| .982 | .157 | .243 | .148 | .225 |
| .988 | .144 | .233 | .137 | .217 |
| .996 | .127 | .218 | .106 | .202 |

TABLE IX. - SECTION NORMAL-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS OFF

(a) $M = 1.20$

| α , deg | x/l | $C_{n,t}$ for - | | | |
|----------------|-------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| -8 | 0.020 | 0.008 | 0.038 | 0.047 | 0.055 |
| | .119 | -.053 | -.033 | .002 | .031 |
| | .250 | -.086 | -.087 | -.061 | -.047 |
| | .428 | -.041 | -.041 | -.019 | -.003 |
| | .709 | .013 | .006 | .046 | .045 |
| | .947 | -.058 | -.057 | -.054 | -.052 |
| -4 | 0.020 | .028 | .042 | .041 | .048 |
| | .119 | -.014 | -.009 | .006 | .019 |
| | .225 | -.078 | -.079 | -.072 | -.063 |
| | .428 | -.035 | -.030 | -.023 | -.016 |
| | .709 | .018 | .020 | .029 | .035 |
| | .947 | -.105 | -.101 | -.098 | -.099 |
| 0 | 0.020 | .039 | .045 | .038 | .040 |
| | .119 | -.008 | .008 | .009 | .009 |
| | .250 | -.065 | -.068 | -.073 | -.076 |
| | .428 | -.034 | -.032 | -.033 | -.032 |
| | .709 | .026 | .023 | .048 | .041 |
| | .947 | -.154 | -.149 | -.144 | -.140 |

| α , deg | x/l | $C_{n,t}$ for - | | | |
|----------------|-------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 4 | 0.020 | 0.020 | 0.020 | 0.032 | 0.040 |
| | .119 | -.119 | -.005 | .005 | .005 |
| | .250 | -.250 | -.089 | -.086 | -.076 |
| | .428 | -.030 | -.029 | -.029 | -.024 |
| | .709 | .026 | .030 | .036 | .032 |
| | .947 | -.202 | -.182 | -.165 | -.148 |
| 8 | 0.020 | 0.020 | 0.015 | .026 | .030 |
| | .119 | -.119 | -.046 | -.040 | -.025 |
| | .250 | -.158 | -.132 | -.089 | -.060 |
| | .428 | -.057 | -.047 | -.019 | -.002 |
| | .709 | .018 | .028 | .045 | .045 |
| | .947 | -.257 | -.218 | -.153 | -.113 |

TABLE IX. - SECTION NORMAL-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS OFF - Concluded

(b) $M = 1.30$

| α , deg | x/l | c _{n,t} for - | | | |
|----------------|-------|------------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| -8 | 0.020 | 0.007 | 0.030 | 0.035 | 0.039 |
| | .119 | -.040 | -.051 | .005 | .022 |
| | .250 | -.075 | -.073 | -.048 | -.033 |
| | .428 | -.035 | -.024 | -.008 | -.020 |
| | .709 | .011 | .015 | .024 | .039 |
| | .947 | -.113 | -.094 | -.070 | -.071 |
| -4 | .020 | .021 | .032 | .030 | .038 |
| | .119 | -.014 | -.013 | .004 | .017 |
| | .250 | -.063 | -.057 | -.050 | -.039 |
| | .428 | -.028 | -.027 | -.023 | -.013 |
| | .709 | .015 | .018 | .022 | .032 |
| | .947 | -.121 | -.115 | -.104 | -.100 |
| 0 | .020 | .028 | .035 | .030 | .028 |
| | .119 | -.007 | .004 | .007 | .005 |
| | .250 | -.057 | -.055 | -.057 | -.060 |
| | .428 | -.024 | -.026 | -.026 | -.025 |
| | .709 | .015 | .020 | .017 | .027 |
| | .947 | -.154 | -.154 | -.151 | -.150 |

| α , deg | x/l | c _{n,t} for - | | | |
|----------------|-------|------------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 4 | | 0.020 | 0.022 | 0.029 | 0.026 |
| | | .119 | -.005 | -.005 | .005 |
| | | .250 | -.073 | -.069 | -.058 |
| | | .428 | -.033 | -.030 | -.023 |
| | | .709 | .019 | .025 | .029 |
| | | .947 | -.192 | -.177 | -.165 |
| 8 | | 0.020 | 0.006 | .019 | .024 |
| | | .119 | -.038 | -.033 | -.014 |
| | | .250 | -.136 | -.108 | -.064 |
| | | .428 | -.053 | -.043 | -.016 |
| | | .709 | .017 | .030 | .047 |
| | | .947 | -.247 | -.205 | -.154 |

TABLE X. - SECTION NORMAL-FORCE COEFFICIENTS FOR SATURN
 MODEL TANK WITH SEAL STRIPS ON

(a) $\alpha = 0^\circ$; $\phi = 0^\circ$

| x/l | $c_{n,t}$ for - | | | | | |
|-------|-----------------|----------|----------|----------|----------|----------|
| | M = 0.80 | M = 0.90 | M = 0.95 | M = 1.00 | M = 1.03 | M = 1.15 |
| 0.020 | -0.038 | -0.008 | -0.037 | -0.061 | -0.058 | -0.054 |
| .119 | -.184 | -.087 | -.096 | -.106 | -.158 | -.103 |
| .250 | -.270 | -.302 | -.344 | -.309 | -.309 | -.233 |
| .428 | -.271 | -.316 | -.436 | -.380 | -.354 | -.269 |
| .709 | -.258 | -.283 | -.390 | -.393 | -.331 | -.241 |
| .947 | -.328 | -.379 | -.518 | -.577 | -.560 | -.507 |

TABLE X. - SECTION NORMAL-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS ON - Continued

(b) M = 1.20

| | | c _{n,t} for - | | | |
|--------|------|------------------------|-----------|---------|-----------|
| ω, deg | x/l | φ = 0° | φ = 22.5° | φ = 45° | φ = 67.5° |
| 4 | .020 | -0.059 | -0.064 | -0.059 | -0.001 |
| | .119 | -.107 | -.147 | -.102 | -.089 |
| | .250 | -.227 | -.224 | -.227 | -.218 |
| | .428 | -.263 | -.262 | -.239 | -.230 |
| | .709 | -.199 | -.202 | -.198 | -.200 |
| | .947 | -.516 | -.518 | -.509 | -.496 |
| 8 | .020 | -.074 | -.076 | -.069 | -.002 |
| | .119 | -.145 | -.146 | -.120 | -.087 |
| | .250 | -.274 | -.272 | -.230 | -.192 |
| | .428 | -.273 | -.260 | -.227 | -.210 |
| | .709 | -.212 | -.212 | -.186 | -.163 |
| | .947 | -.566 | -.553 | -.507 | -.451 |

TABLE X.- SECTION NORMAL-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS ON - Concluded

(c) $M = 1.30$

| α , deg | x/l | $c_{n,t}$ for - | | | |
|----------------|-------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| -8 | .020 | -0.079 | -0.068 | -0.055 | 0.002 |
| | .119 | -.132 | -.144 | -.083 | -.054 |
| | .250 | -.185 | -.191 | -.116 | -.154 |
| | .428 | -.216 | -.219 | -.211 | -.195 |
| | .709 | -.180 | -.166 | -.153 | -.127 |
| | .947 | -.398 | -.395 | -.400 | -.412 |
| -4 | .020 | -.063 | -.060 | -.052 | -.007 |
| | .119 | -.112 | -.115 | -.088 | -.071 |
| | .250 | -.179 | -.179 | -.177 | -.175 |
| | .428 | -.210 | -.206 | -.207 | -.200 |
| | .709 | -.170 | -.160 | -.159 | -.157 |
| | .947 | -.390 | -.392 | -.402 | -.421 |
| 0 | .020 | -.049 | -.049 | -.053 | -.052 |
| | .119 | -.082 | -.091 | -.090 | -.087 |
| | .250 | -.180 | -.185 | -.185 | -.187 |
| | .428 | -.205 | -.206 | -.207 | -.208 |
| | .709 | -.159 | -.161 | -.165 | -.174 |
| | .947 | -.426 | -.429 | -.427 | -.429 |

| α , deg | x/l | $c_{n,t}$ for - | | | |
|----------------|-------|------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 4 | | 0.020 | -0.057 | -0.056 | -0.006 |
| | | .119 | -.089 | -.085 | -.078 |
| | | .250 | -.196 | -.186 | -.175 |
| | | .428 | -.208 | -.206 | -.198 |
| | | .709 | -.166 | -.164 | -.169 |
| | | .947 | -.465 | -.460 | -.446 |
| 8 | | .020 | -.024 | -.073 | -.005 |
| | | .119 | -.119 | -.125 | -.076 |
| | | .250 | -.239 | -.229 | -.150 |
| | | .428 | -.230 | -.225 | -.170 |
| | | .709 | -.202 | -.173 | -.146 |
| | | .947 | -.507 | -.485 | -.399 |

$$(a) M = 1.20$$

| | | c _{y,t} for - | | | | |
|--------|-------|------------------------|-----------|---------|-----------|---------|
| | | φ = 0° | φ = 22.5° | φ = 45° | φ = 67.5° | φ = 90° |
| α, deg | x/l | | | | | |
| -8 | 0.020 | 0.001 | 0.004 | 0.008 | 0.002 | 0.000 |
| | .119 | -.004 | .048 | .359 | .008 | -.013 |
| | .250 | -.004 | .009 | .009 | -.007 | -.035 |
| | .428 | .014 | .010 | .005 | -.005 | .008 |
| | .709 | -.002 | .005 | .030 | .009 | -.027 |
| | .947 | .059 | .022 | .062 | .032 | -.009 |
| -4 | .020 | .002 | -.004 | .004 | .001 | .001 |
| | .119 | -.005 | .018 | .013 | .003 | -.007 |
| | .250 | -.005 | .002 | -.001 | -.006 | -.013 |
| | .428 | .005 | .004 | .000 | -.004 | -.004 |
| | .709 | -.003 | -.002 | -.005 | -.005 | -.003 |
| | .947 | .008 | .000 | .005 | .006 | -.015 |
| 0 | .020 | .002 | -.004 | .004 | .002 | .002 |
| | .119 | -.002 | -.002 | -.003 | -.002 | -.002 |
| | .250 | -.002 | -.001 | -.004 | -.003 | -.000 |
| | .428 | .004 | .003 | .002 | .006 | .004 |
| | .709 | -.004 | -.003 | -.013 | -.009 | -.003 |
| | .947 | .003 | -.005 | .019 | .015 | -.007 |

TABLE XI.— SECTION SIDE-FORCE COEFFICIENTS FOR SATURN MODEL TANK WITH SEAL STRIPS OFF

| α , deg | x/l | c _{y,t} for - | | | |
|----------------|-------|------------------------|---------------------|-------------------|---------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ |
| 4 | 0.020 | 0.004 | -0.004 | 0.005 | 0.004 |
| | .119 | .000 | .011 | .012 | .005 |
| | .250 | -.001 | .008 | .014 | .012 |
| | .428 | .000 | .008 | .007 | .008 |
| | .709 | -.002 | -.001 | -.005 | -.003 |
| | .947 | -.004 | -.010 | .029 | .025 |
| | .020 | .002 | -.004 | .004 | .006 |
| | .119 | -.002 | .039 | .053 | .021 |
| | .250 | -.007 | .017 | .042 | .038 |
| | .428 | -.001 | .017 | .021 | .014 |
| 8 | .709 | -.004 | .005 | .004 | -.004 |
| | .947 | -.011 | .028 | .084 | .063 |
| | .020 | .002 | -.004 | .004 | .011 |
| | .119 | -.002 | .039 | .053 | .021 |
| | .250 | -.007 | .017 | .042 | .038 |

TABLE XI.- SECTION SIDE-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS OFF - Concluded

(b) $M = 1.30$

| α , deg | x/l | $c_{y,t}$ for - | | |
|----------------|-------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| -8 | 0.020 | 0.004 | -0.001 | 0.009 |
| | .119 | .001 | .040 | .028 |
| | .250 | .002 | .014 | .015 |
| | .428 | .002 | .006 | .003 |
| | .709 | .001 | .000 | .019 |
| | .947 | .004 | .037 | .044 |
| -4 | .020 | .002 | -.006 | .005 |
| | .119 | -.001 | .017 | .015 |
| | .250 | -.002 | .023 | .005 |
| | .428 | -.002 | .002 | .000 |
| | .709 | -.001 | -.001 | .001 |
| | .947 | -.001 | .001 | .007 |
| 0 | .020 | .002 | -.004 | .002 |
| | .119 | -.002 | .001 | -.002 |
| | .250 | -.001 | .000 | .001 |
| | .428 | .002 | .001 | .004 |
| | .709 | -.002 | -.003 | -.001 |
| | .947 | -.013 | -.005 | .007 |

| α , deg | x/l | $c_{y,t}$ for - | | |
|----------------|-------|------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 4 | 0.020 | 0.020 | 0.002 | -0.003 |
| | .119 | .011 | .119 | .010 |
| | .250 | .033 | .250 | .007 |
| | .428 | .011 | .428 | .007 |
| | .709 | .000 | .709 | .000 |
| | .947 | .001 | .947 | .013 |
| 8 | 0.020 | 0.020 | 0.001 | -0.004 |
| | .119 | .011 | .119 | .011 |
| | .250 | .033 | .250 | .005 |
| | .428 | .011 | .428 | .004 |
| | .709 | .000 | .709 | .000 |
| | .947 | .010 | .947 | .037 |

TABLE XII.- SECTION SIDE-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS ON

(a) $\alpha = 0^\circ$; $\phi = 0^\circ$

| x/l | $c_{y,t}$ for - | | | | | |
|-------|-----------------|----------|----------|----------|----------|----------|
| | M = 0.80 | M = 0.90 | M = 0.95 | M = 1.00 | M = 1.03 | M = 1.15 |
| 0.020 | -0.023 | -0.030 | -0.036 | -0.036 | -0.032 | -0.024 |
| .119 | .003 | .001 | .001 | .001 | -.048 | .006 |
| .250 | -.006 | -.007 | -.008 | -.008 | -.085 | -.003 |
| .428 | -.001 | .002 | .004 | .002 | .001 | .000 |
| .709 | .007 | .003 | .002 | .007 | .008 | .001 |
| .947 | -.057 | -.062 | -.092 | -.099 | -.097 | -.082 |

TABLE XII.- SECTION SIDE-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS ON - Continued

(b) $M = 1.20$

| α , deg | x/l | c _{y,t} for - | | |
|----------------|-------|------------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| -8 | 0.020 | -0.018 | -0.021 | -0.020 |
| | .119 | -.004 | .062 | .060 |
| | .250 | -.005 | -.009 | -.006 |
| | .428 | .004 | .010 | .009 |
| | .709 | -.003 | .022 | .024 |
| | .947 | -.056 | -.077 | -.064 |
| -4 | .020 | -.019 | -.023 | -.024 |
| | .119 | -.007 | .020 | .023 |
| | .250 | -.007 | -.009 | -.014 |
| | .428 | .003 | .002 | -.002 |
| | .709 | .002 | .005 | .004 |
| | .947 | -.063 | -.091 | -.095 |
| 0 | .020 | -.021 | -.020 | -.022 |
| | .119 | -.004 | -.004 | -.003 |
| | .250 | -.009 | .005 | -.005 |
| | .428 | .005 | .006 | .003 |
| | .709 | .002 | .000 | -.001 |
| | .947 | -.075 | -.078 | -.071 |

| α , deg | x/l | c _{y,t} for - | | |
|----------------|-----|------------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ |
| 4 | | 0.020 | 0.020 | 0.022 |
| | | .119 | -.002 | -.034 |
| | | .250 | -.012 | -.098 |
| | | .428 | .003 | .013 |
| | | .709 | -.005 | -.003 |
| | | .947 | -.081 | -.084 |
| 6 | | .020 | -.020 | -.022 |
| | | .119 | .001 | .057 |
| | | .250 | -.016 | .000 |
| | | .428 | .003 | .016 |
| | | .709 | -.012 | .003 |
| | | .947 | -.083 | -.069 |

TABLE XII. - SECTION SIDE-FORCE COEFFICIENTS FOR SATURN
MODEL TANK WITH SEAL STRIPS ON - Concluded

(c) $M = 1.30$

| α , deg | x/l | C _{y,t} for - | | | | α , deg | x/l | C _{y,t} for - | | | | |
|----------------|-------|------------------------|---------------------|-------------------|---------------------|-------------------|-------|------------------------|---------------------|-------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| -8 | 0.020 | -0.016 | -0.016 | -0.015 | 0.006 | 0.004 | 4 | 0.020 | -0.018 | -0.019 | -0.021 | -0.002 |
| | .119 | .008 | .060 | .062 | .012 | .034 | | .119 | .001 | .015 | .027 | .028 |
| | .250 | -.005 | .001 | .010 | .010 | .045 | | .250 | -.005 | .003 | .009 | .019 |
| | .428 | -.002 | .003 | .004 | .000 | .007 | | .428 | -.001 | .003 | .005 | .013 |
| | .709 | -.003 | .010 | .015 | .041 | .035 | | .709 | -.005 | .005 | .005 | .007 |
| | .947 | -.048 | -.055 | -.034 | -.020 | -.078 | | .947 | -.066 | -.081 | -.048 | -.032 |
| | | | | | | | | 8 | .020 | .004 | -.018 | -.025 |
| | | | | | | | | | .119 | .002 | .057 | .086 |
| | | | | | | | | | .250 | -.010 | .001 | .021 |
| | | | | | | | | | .428 | -.001 | .016 | .025 |
| | | | | | | | | | .709 | -.038 | .003 | .013 |
| | | | | | | | | | .947 | -.063 | -.066 | -.025 |
| -4 | 0.020 | -.016 | -.021 | -.022 | -.001 | .006 | | | | | | .004 |
| | .119 | .004 | .027 | .028 | .008 | .011 | | | | | | .035 |
| | .250 | -.006 | -.003 | -.006 | -.009 | -.015 | | | | | | .044 |
| | .428 | -.002 | -.003 | -.002 | -.003 | -.003 | | | | | | .012 |
| | .709 | -.002 | -.004 | -.002 | -.040 | -.032 | | | | | | .032 |
| | .947 | -.052 | -.081 | -.071 | -.058 | -.082 | | | | | | .019 |
| 0 | 0.020 | -.017 | -.018 | -.019 | .003 | .001 | | | | | | |
| | .119 | .001 | .003 | .004 | .004 | .004 | | | | | | |
| | .250 | -.005 | -.004 | -.006 | -.006 | -.005 | | | | | | |
| | .428 | -.001 | .001 | .001 | -.001 | .003 | | | | | | |
| | .709 | -.005 | -.006 | -.006 | -.006 | -.032 | | | | | | |
| | .947 | -.054 | -.075 | -.062 | -.062 | -.052 | | | | | | |

| α , deg | x/l | C _{y,t} for - | | | | α , deg | x/l | C _{y,t} for - | | | | |
|----------------|-------|------------------------|---------------------|-------------------|---------------------|-------------------|-------|------------------------|---------------------|-------------------|---------------------|-------------------|
| | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ | | $\phi = 0^\circ$ | $\phi = 22.5^\circ$ | $\phi = 45^\circ$ | $\phi = 67.5^\circ$ | $\phi = 90^\circ$ |
| -8 | 0.020 | -.016 | -0.016 | -0.015 | 0.006 | 0.004 | 4 | 0.020 | -0.018 | -0.019 | -0.021 | -0.002 |
| | .119 | .008 | .060 | .062 | .012 | .034 | | .119 | .001 | .015 | .027 | .028 |
| | .250 | -.005 | .001 | .010 | .010 | .045 | | .250 | -.005 | .003 | .009 | .012 |
| | .428 | -.002 | .003 | .004 | .000 | .007 | | .428 | -.001 | .003 | .005 | .006 |
| | .709 | -.003 | .010 | .015 | .041 | .035 | | .709 | -.005 | .005 | .005 | .007 |
| | .947 | -.048 | -.055 | -.034 | -.020 | -.078 | | .947 | -.066 | -.081 | -.048 | -.037 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

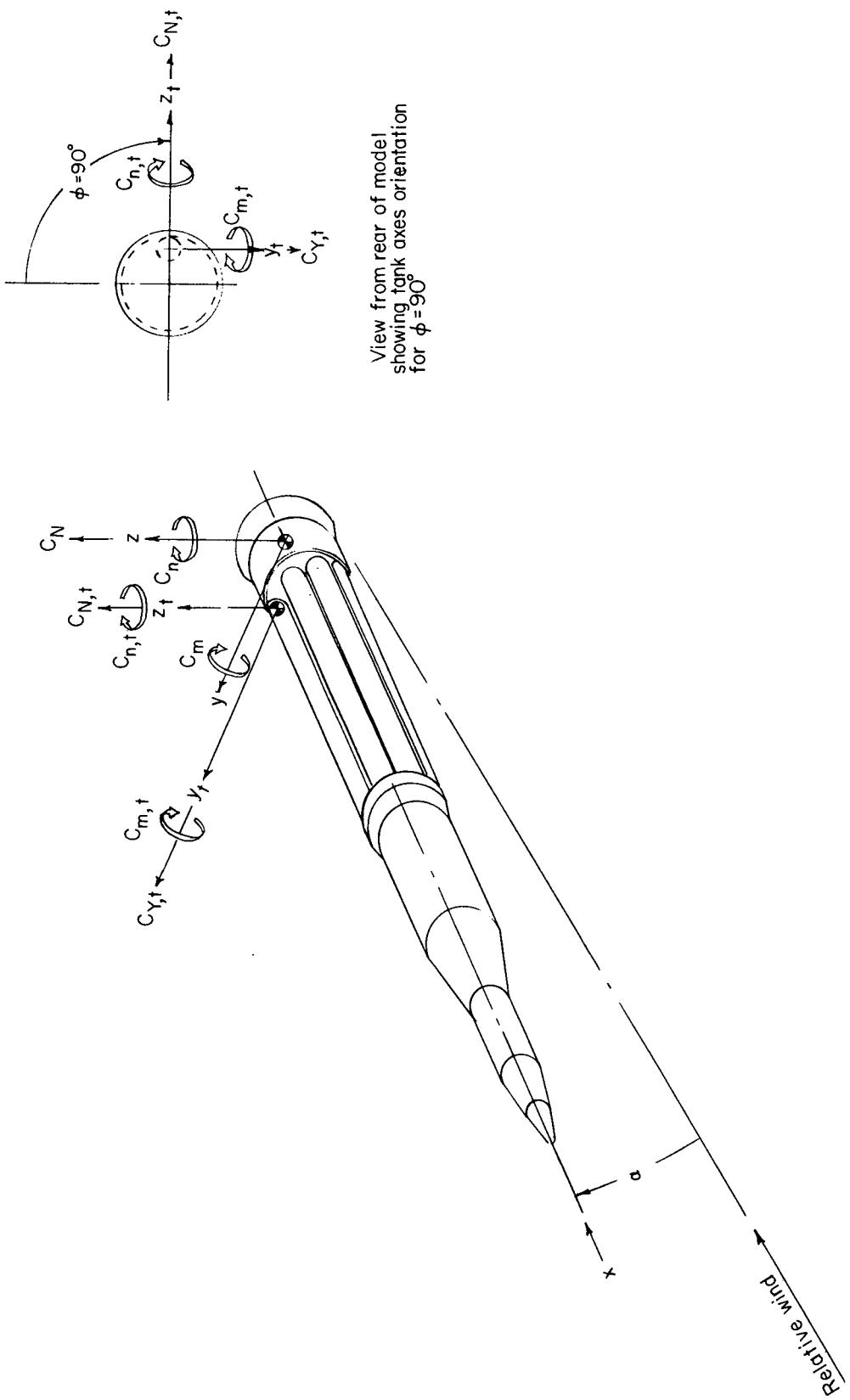


Figure 1.- Body-axis system. Arrows indicate positive direction.

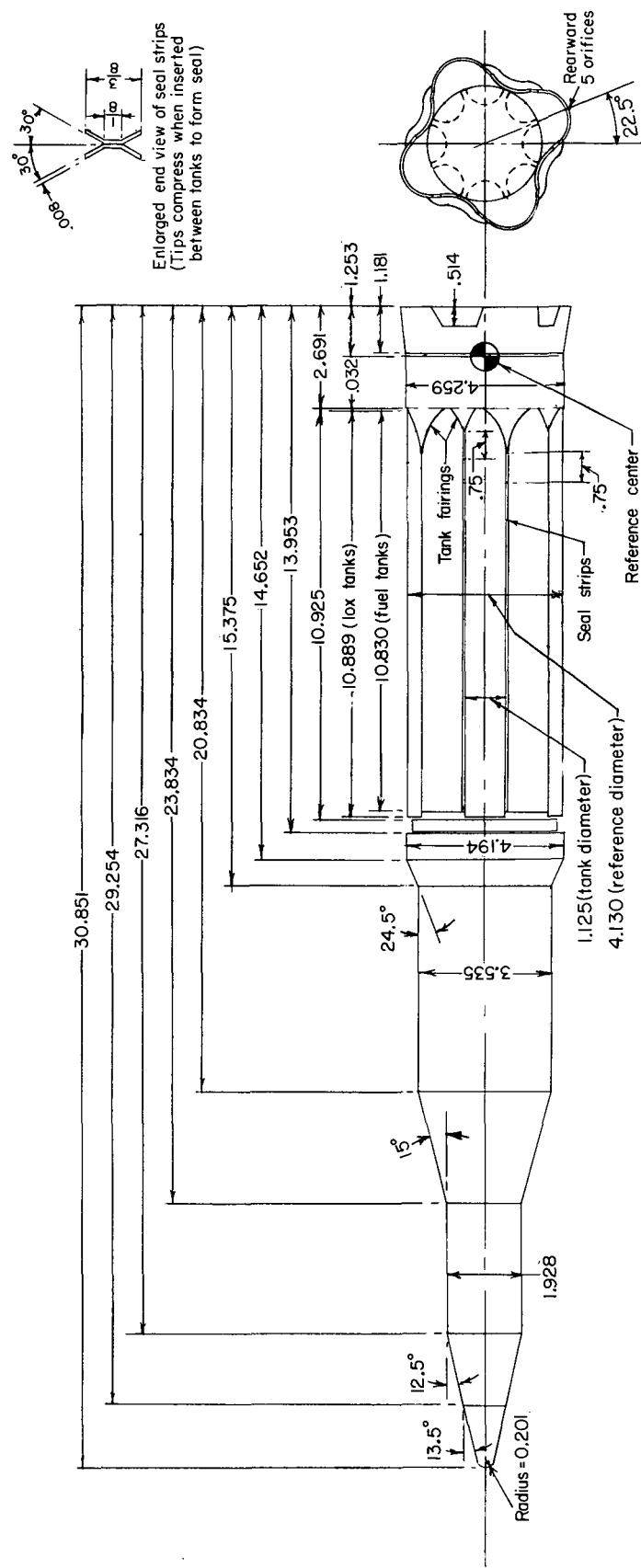


Figure 2.- Details of model. All dimensions are in inches unless otherwise noted.

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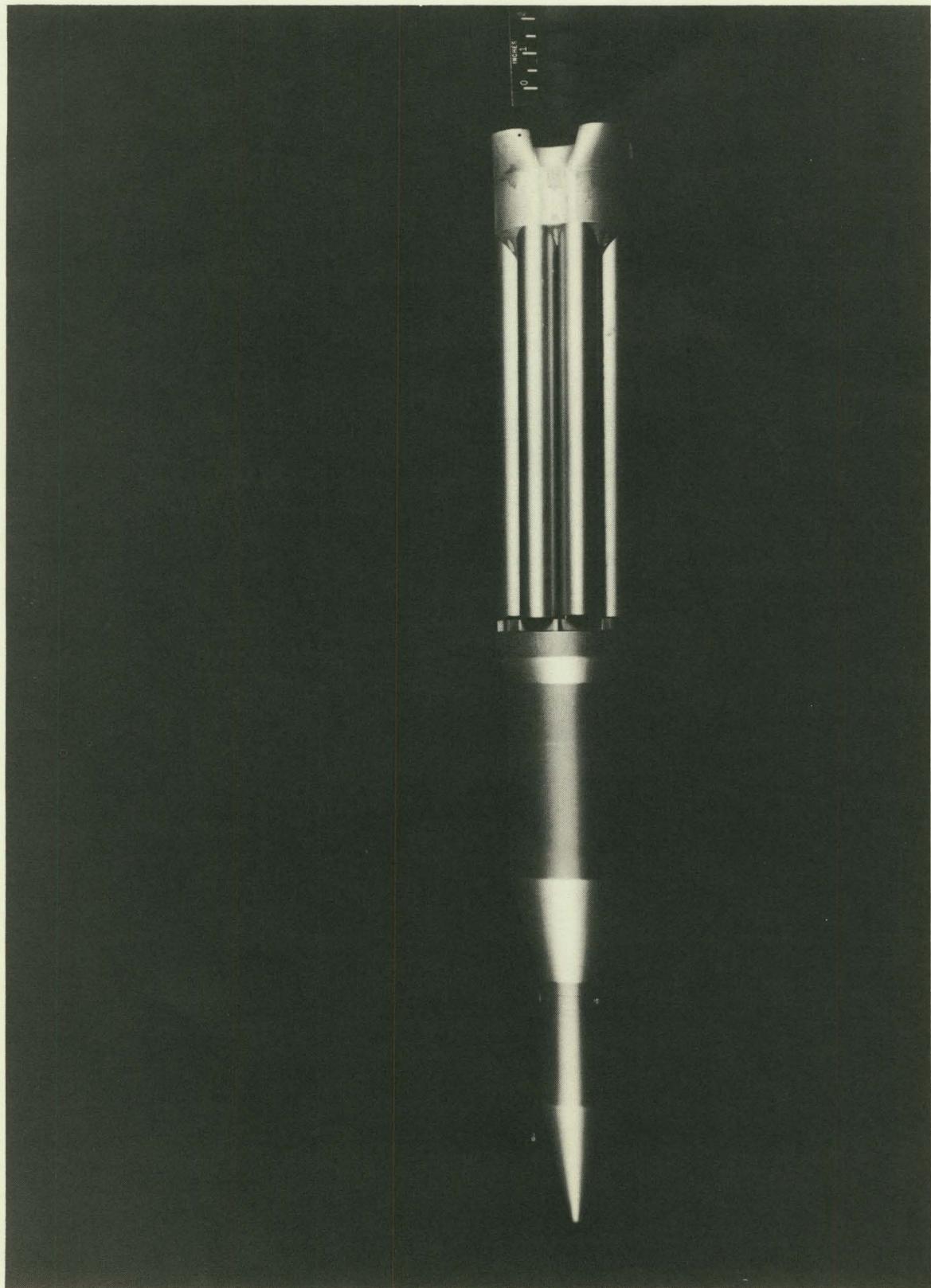


Figure 3.- Photograph of model without seal strips. L-61-2651

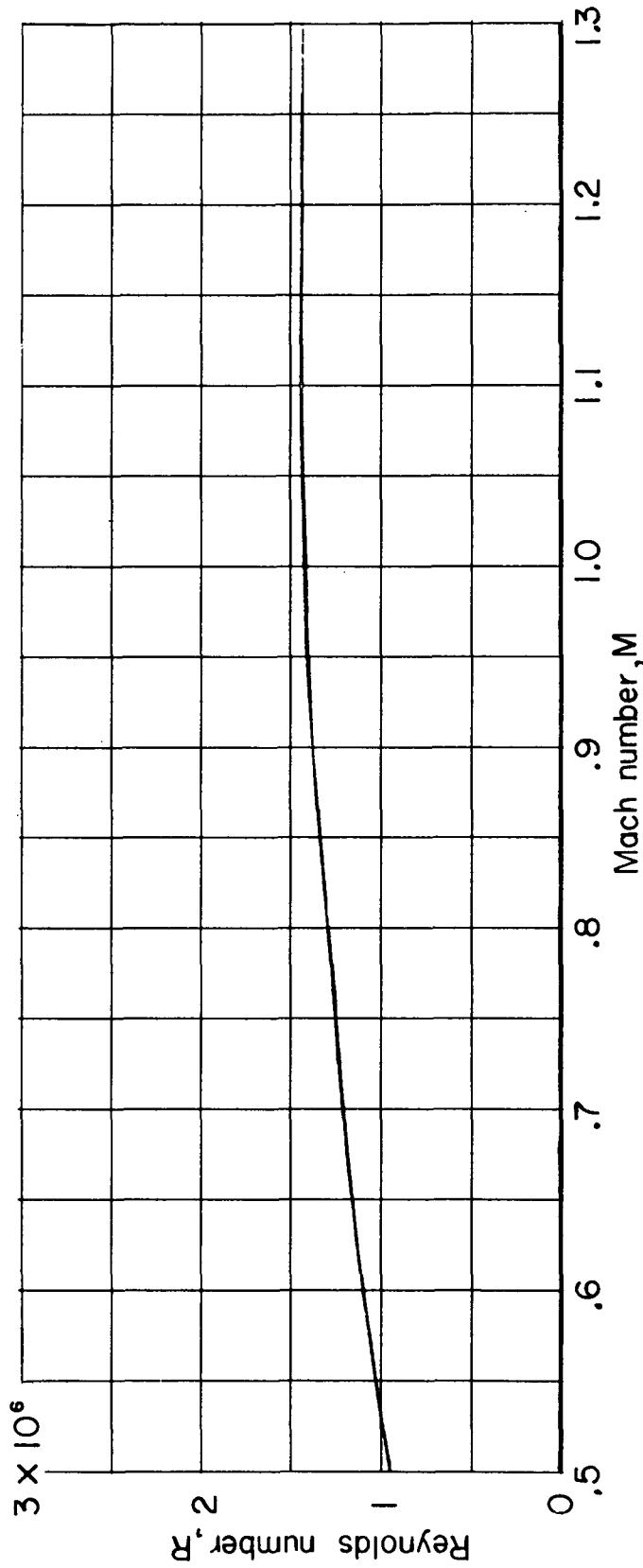
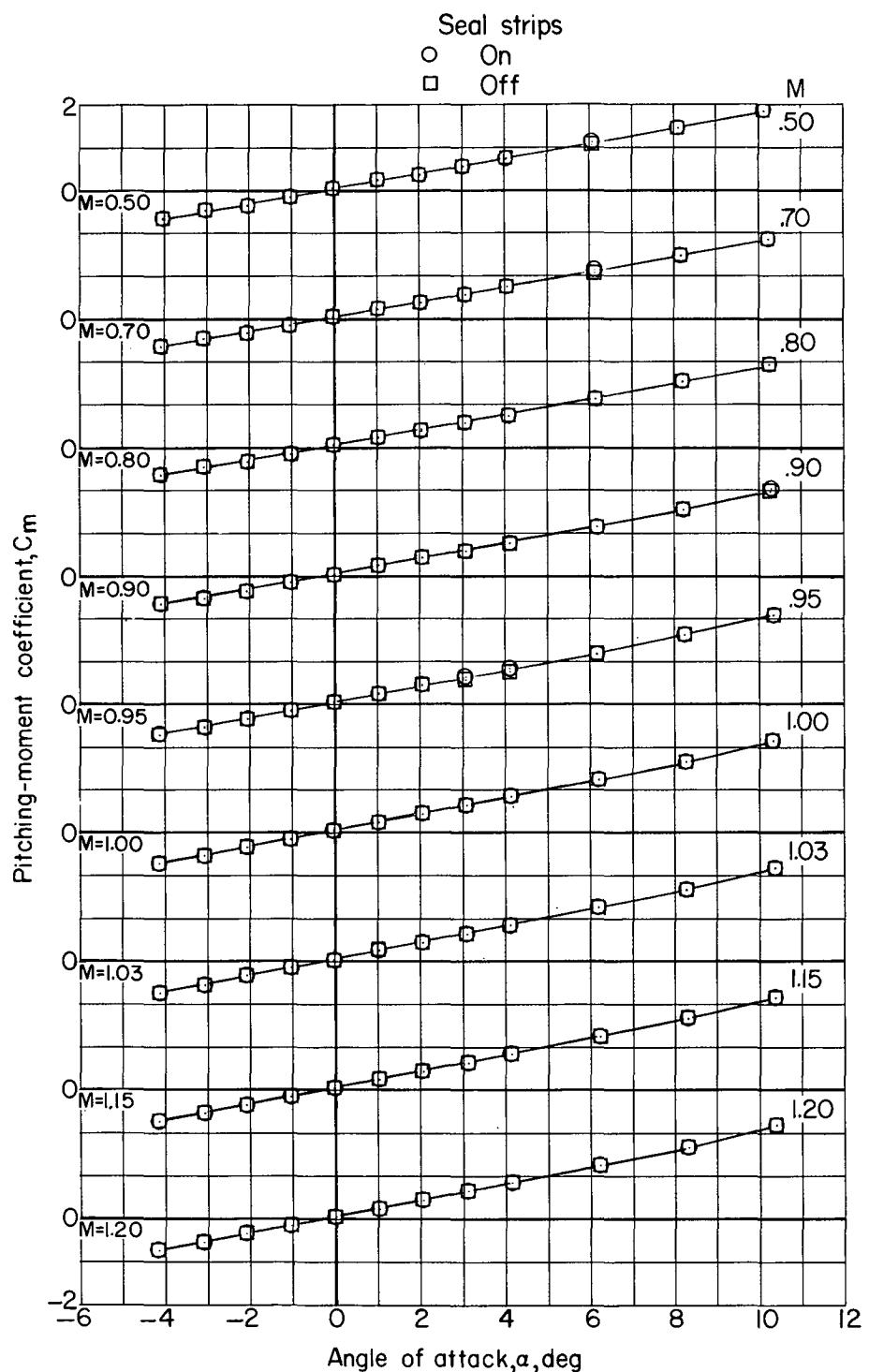
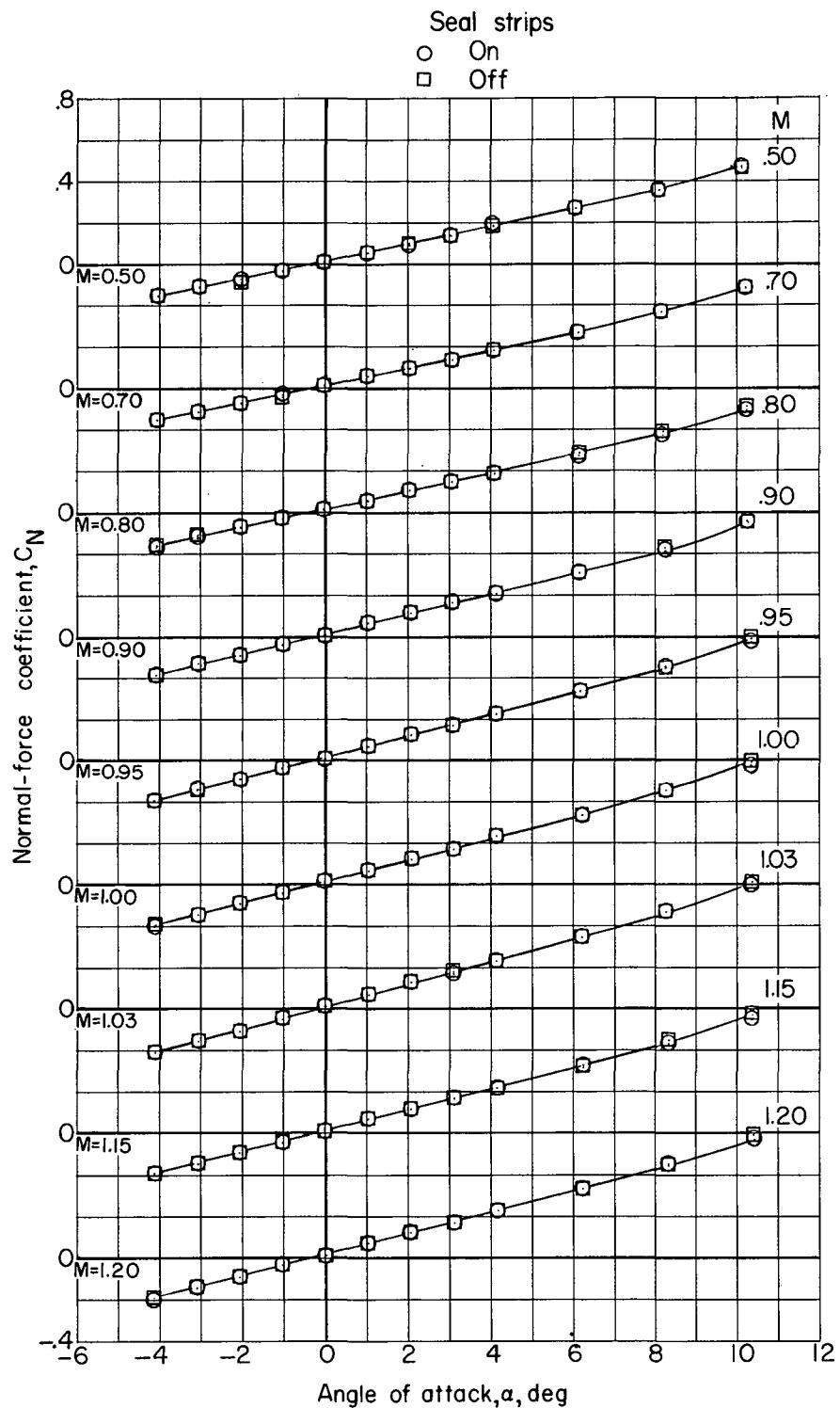


Figure 4.- Variation of Reynolds number, based on model diameter of 4.130 inches and free-stream conditions, with Mach number.



(a) Variation of C_m with α .

Figure 5.- Variation of static longitudinal aerodynamic characteristics of model with angle of attack.



(b) Variation of C_N with α .

Figure 5.- Concluded.

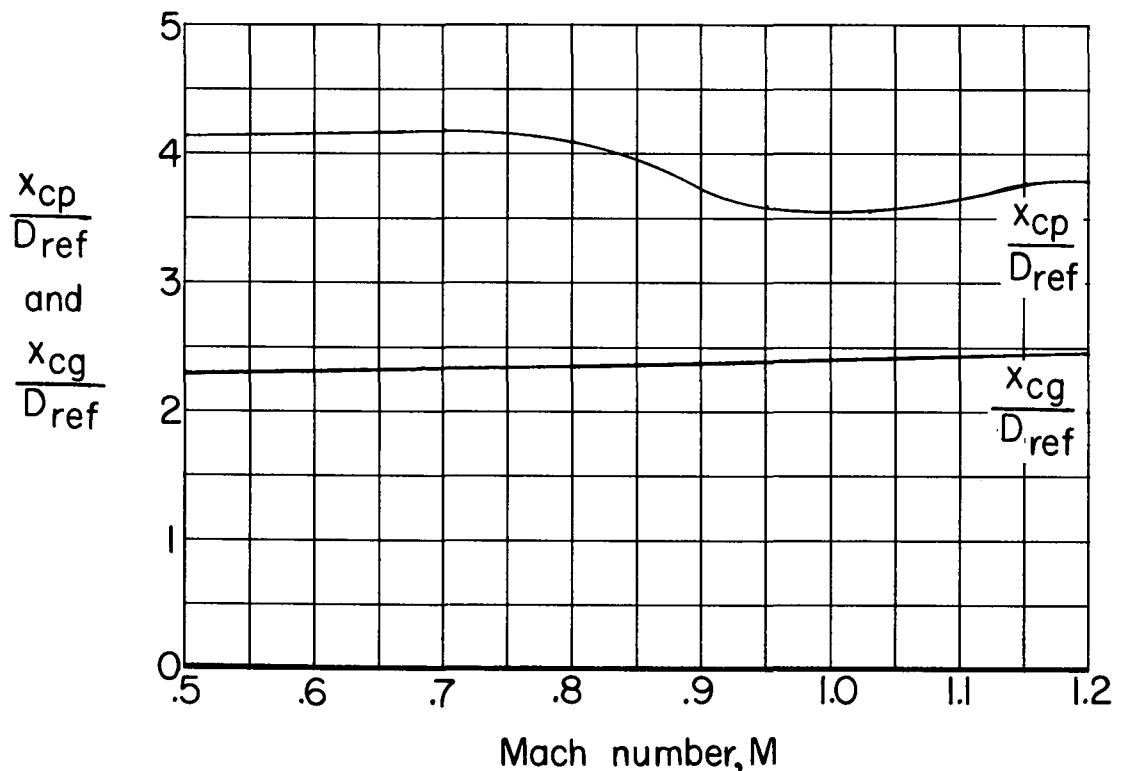
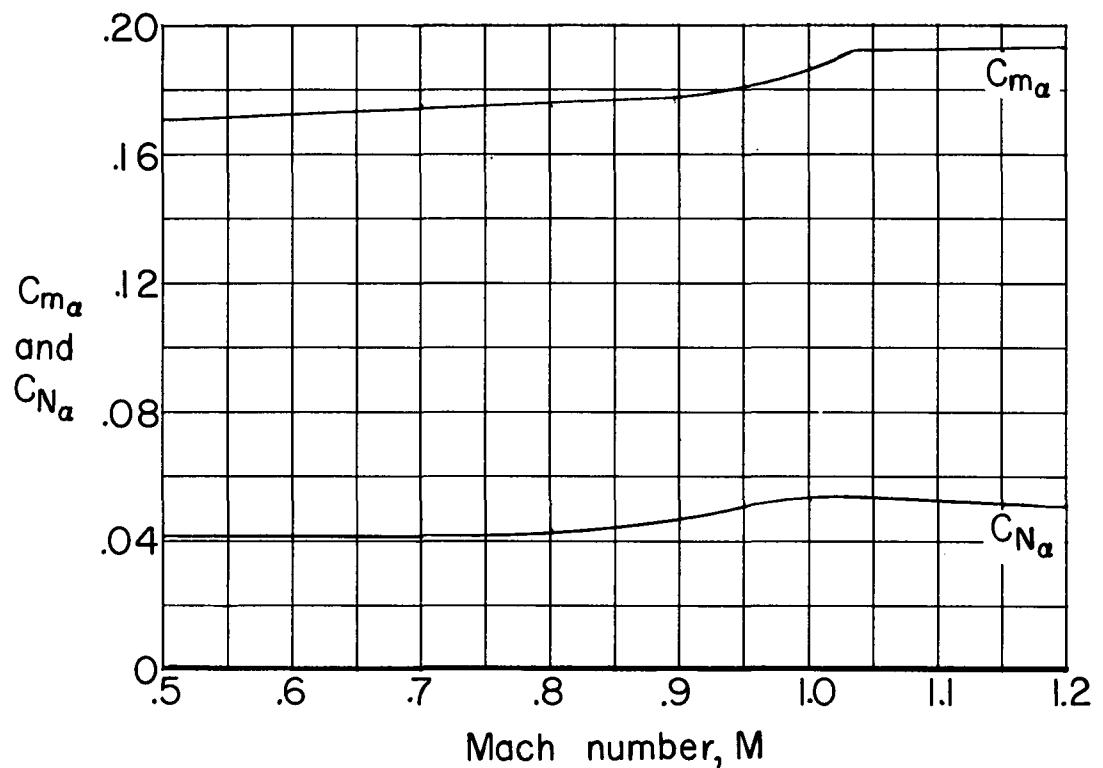


Figure 6.- Summary of static longitudinal characteristics of model and comparison of center-of-pressure locations with estimated center-of-gravity locations.

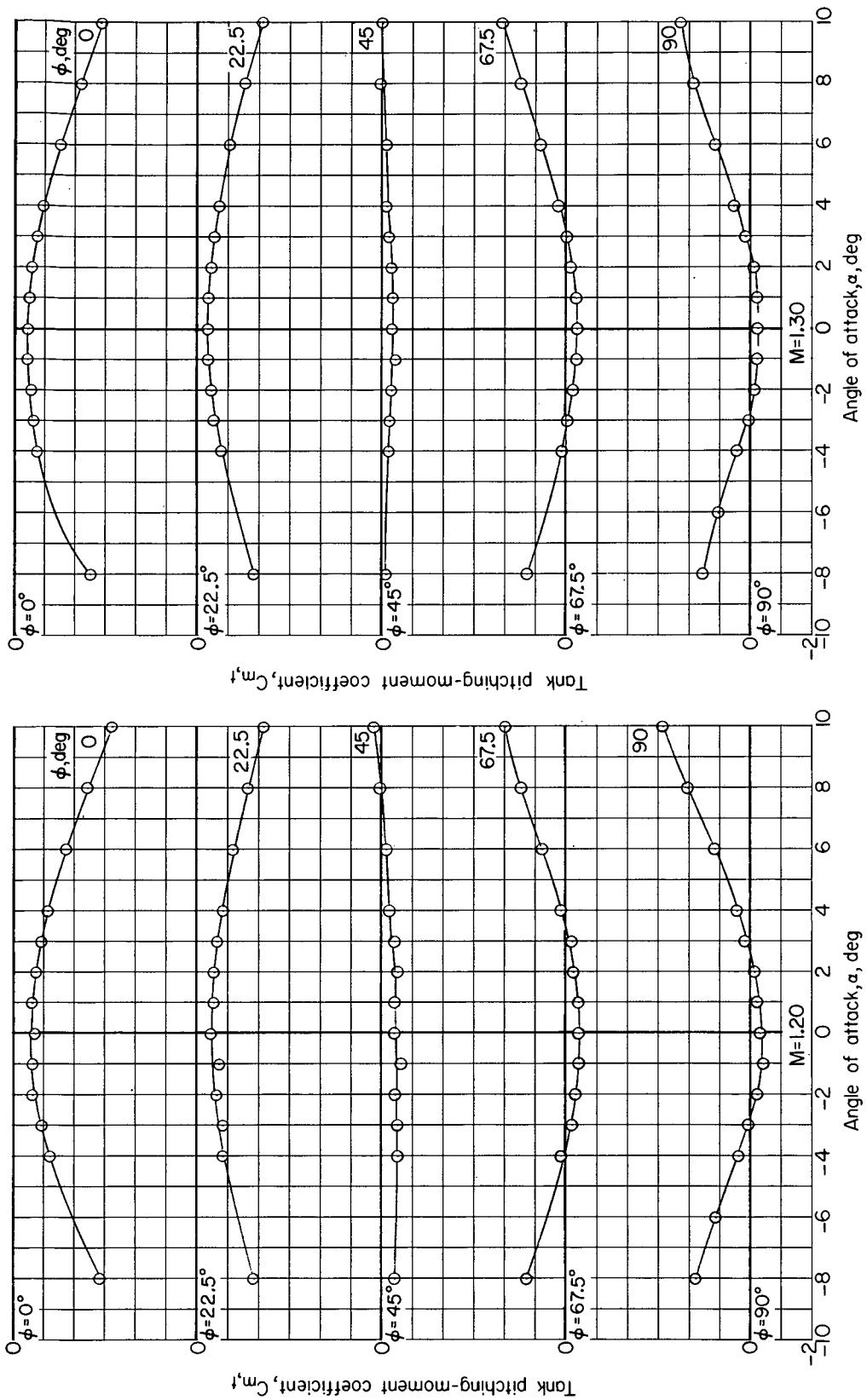
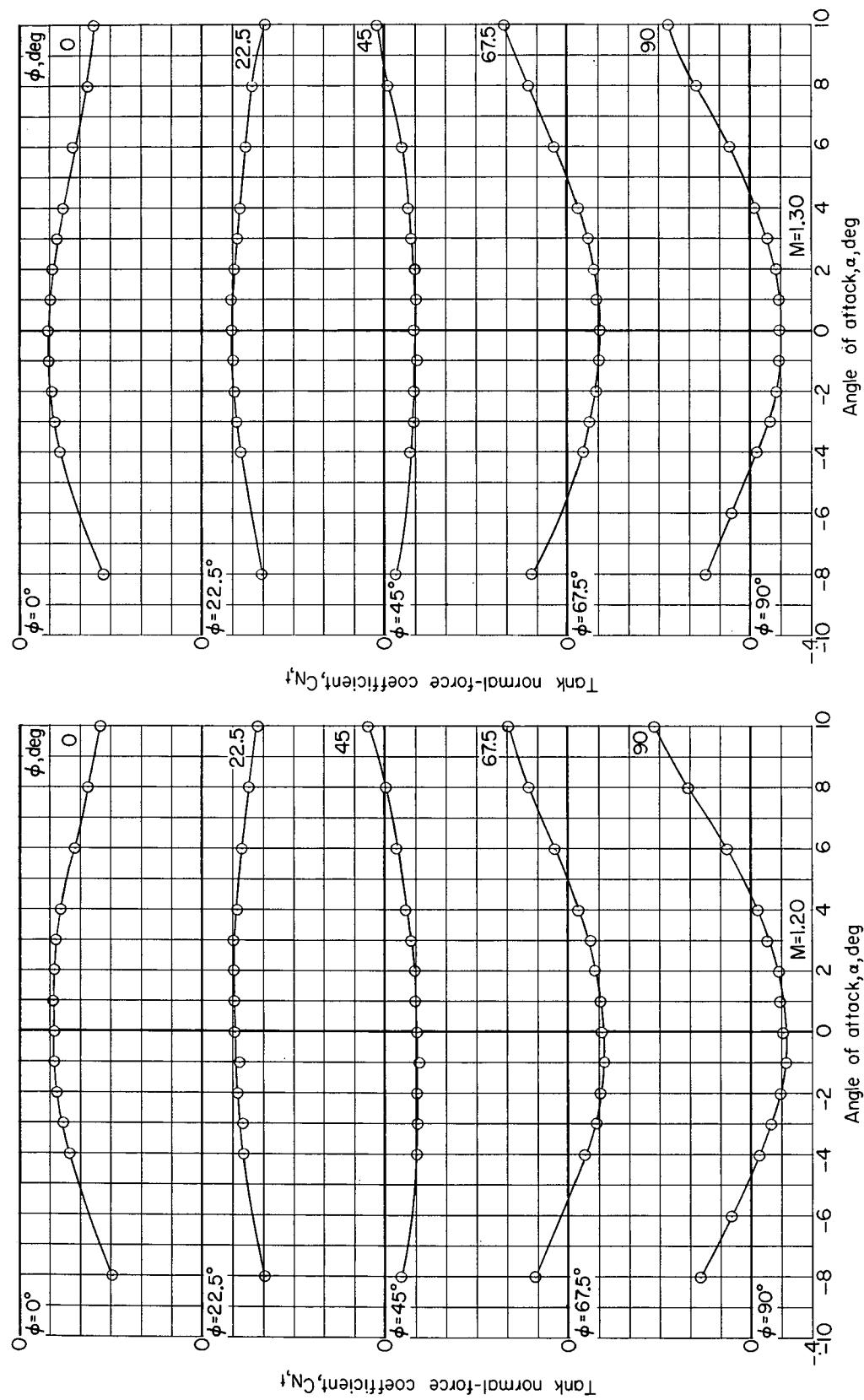
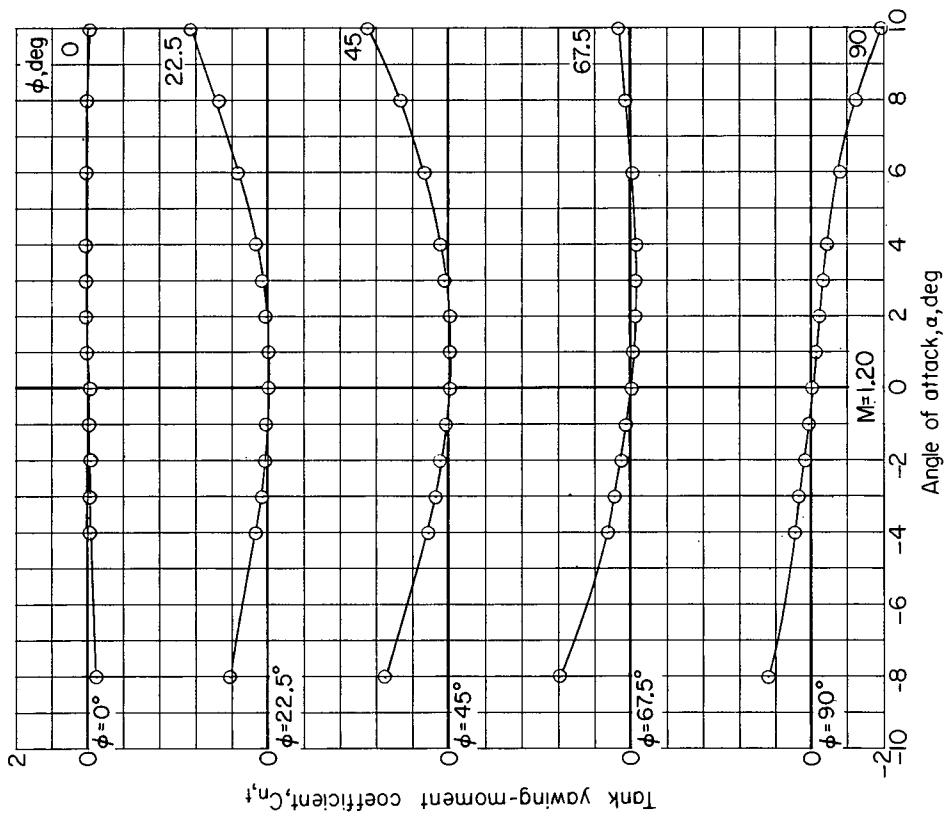
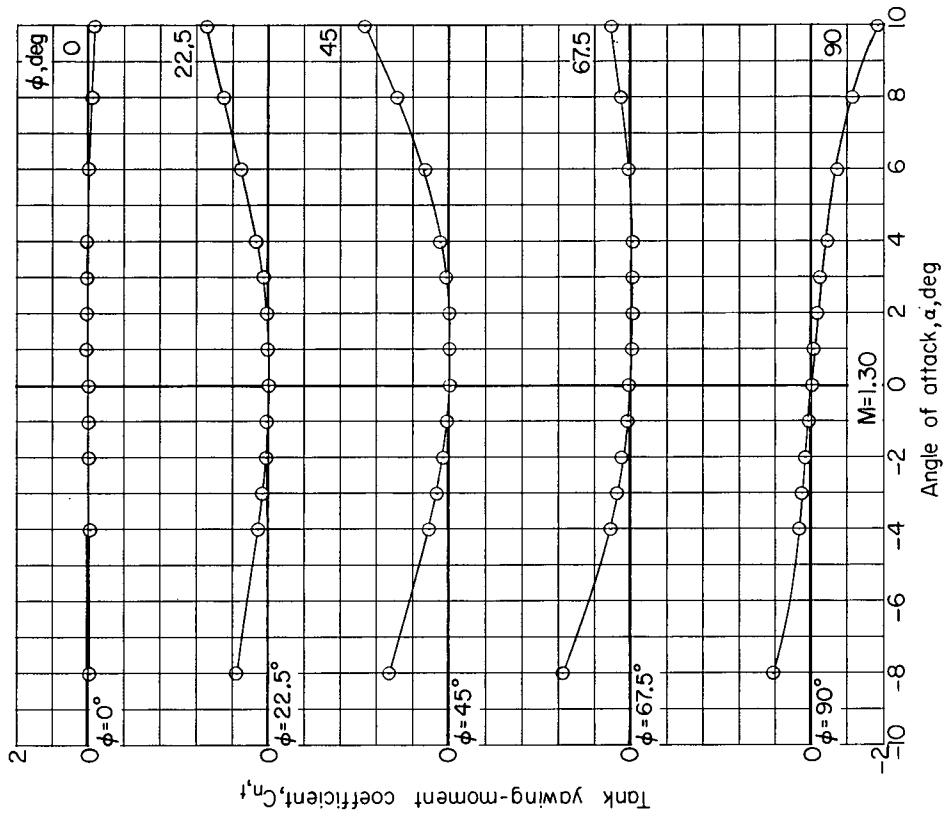


Figure 7.- Variation of static aerodynamic characteristics of model tank with angle of attack.
Seal strips off.

(b) Variation of $C_{N,t}$ with α .
 Figure 7.- Continued.



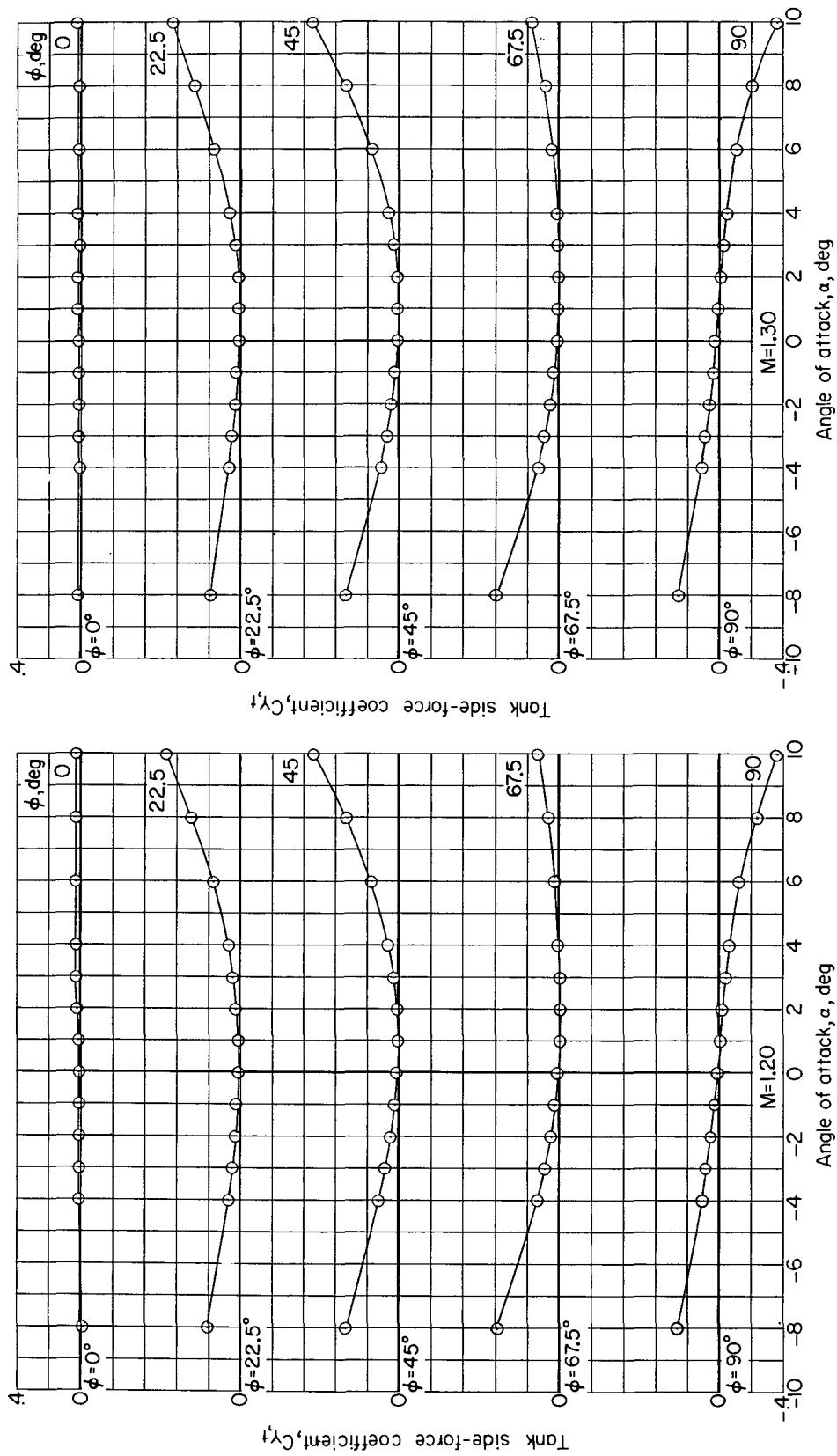


(c) Variation of $C_{n,t}$ with α .

Figure 7.- Continued.

Figure 7-- Concluded.

(d) Variation of $C_{Y,t}$ with α .



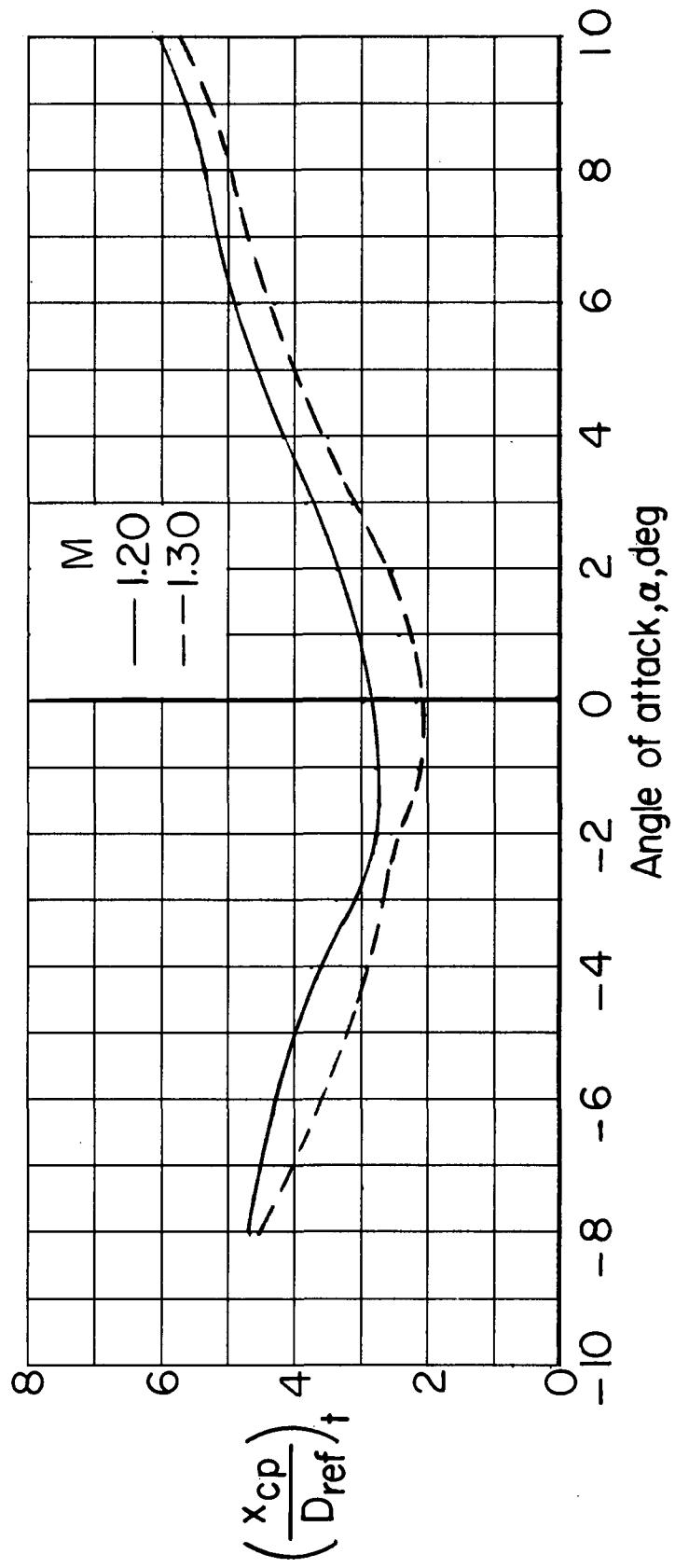
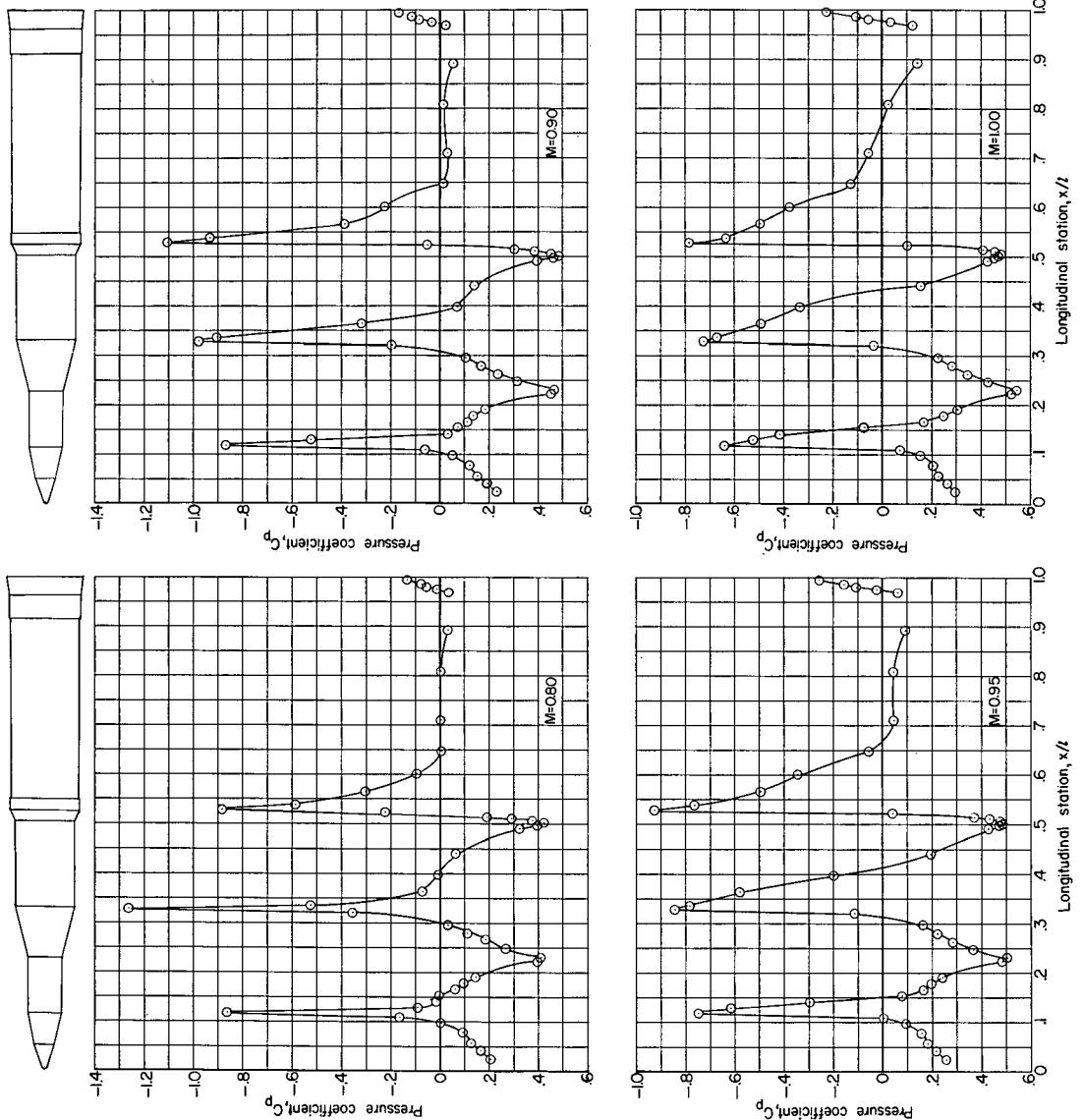
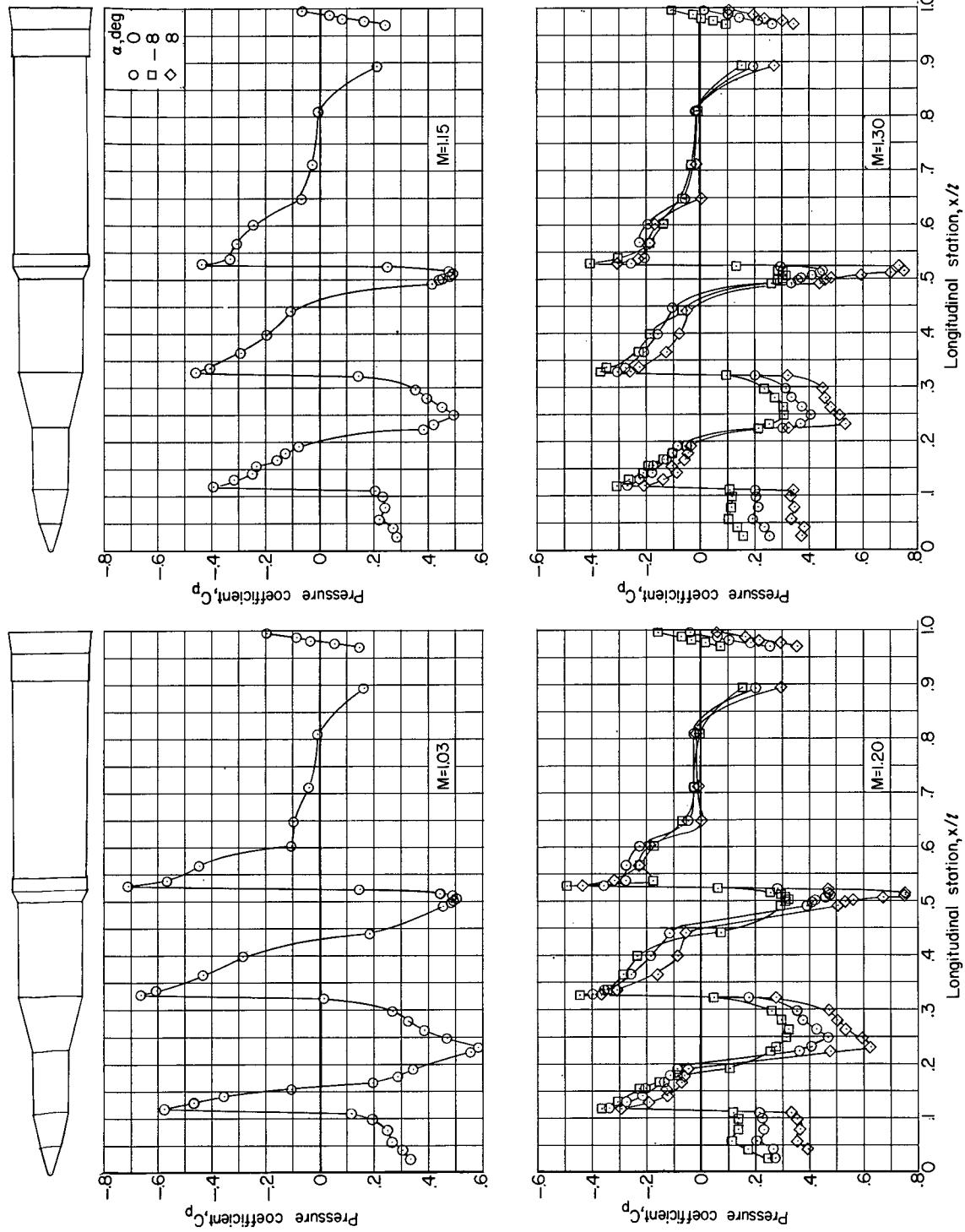


Figure 8.- Variation of center-of-pressure location of model tank with angle of attack. Seal strips off. $\phi = 0^\circ$.



(a) $M = 0.80$ to 1.00 . $\alpha = 0^\circ$.
 $\phi = 0^\circ$.

Figure 9.- Pressure coefficients for model with seal strips on. Orifices located on lower surface.



(b) $M = 1.03$ to 1.30 .

Figure 9.- Concluded.

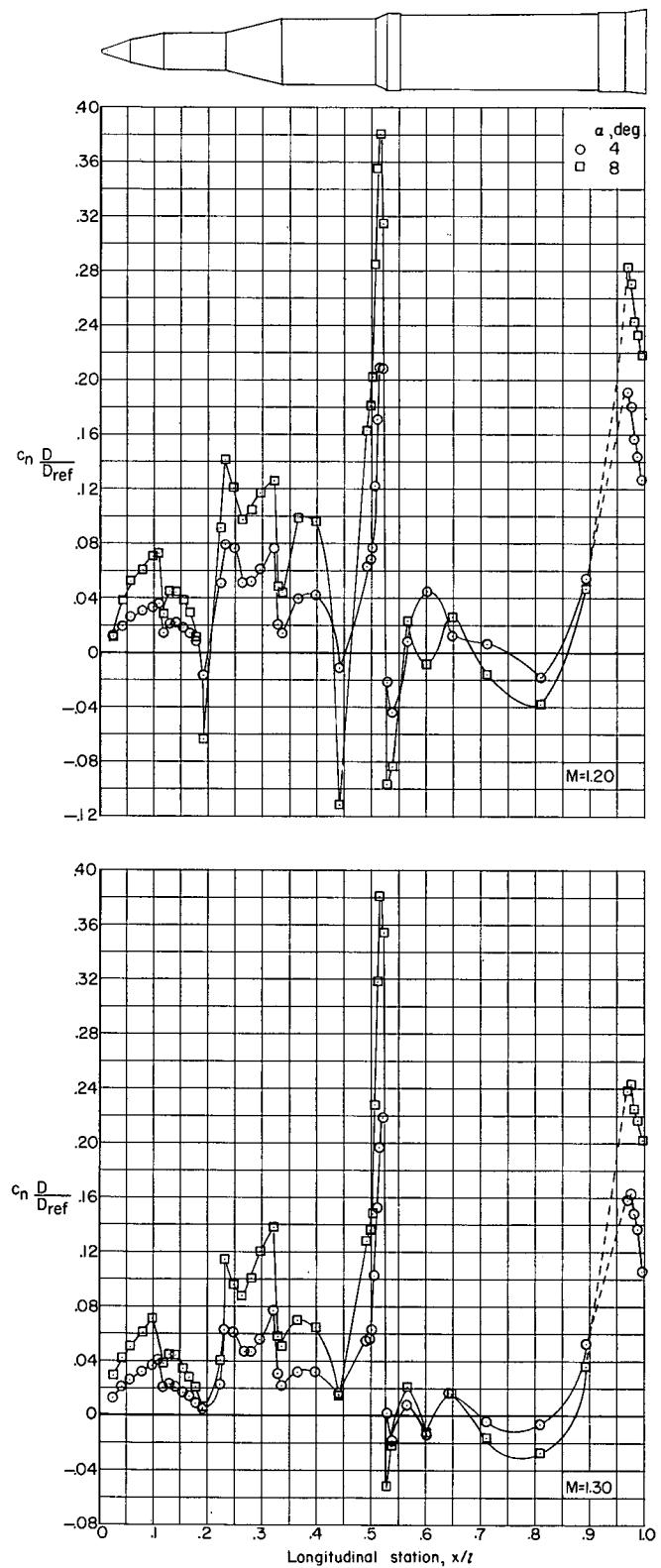


Figure 10.- Section normal-force coefficients for model with seal strips on.

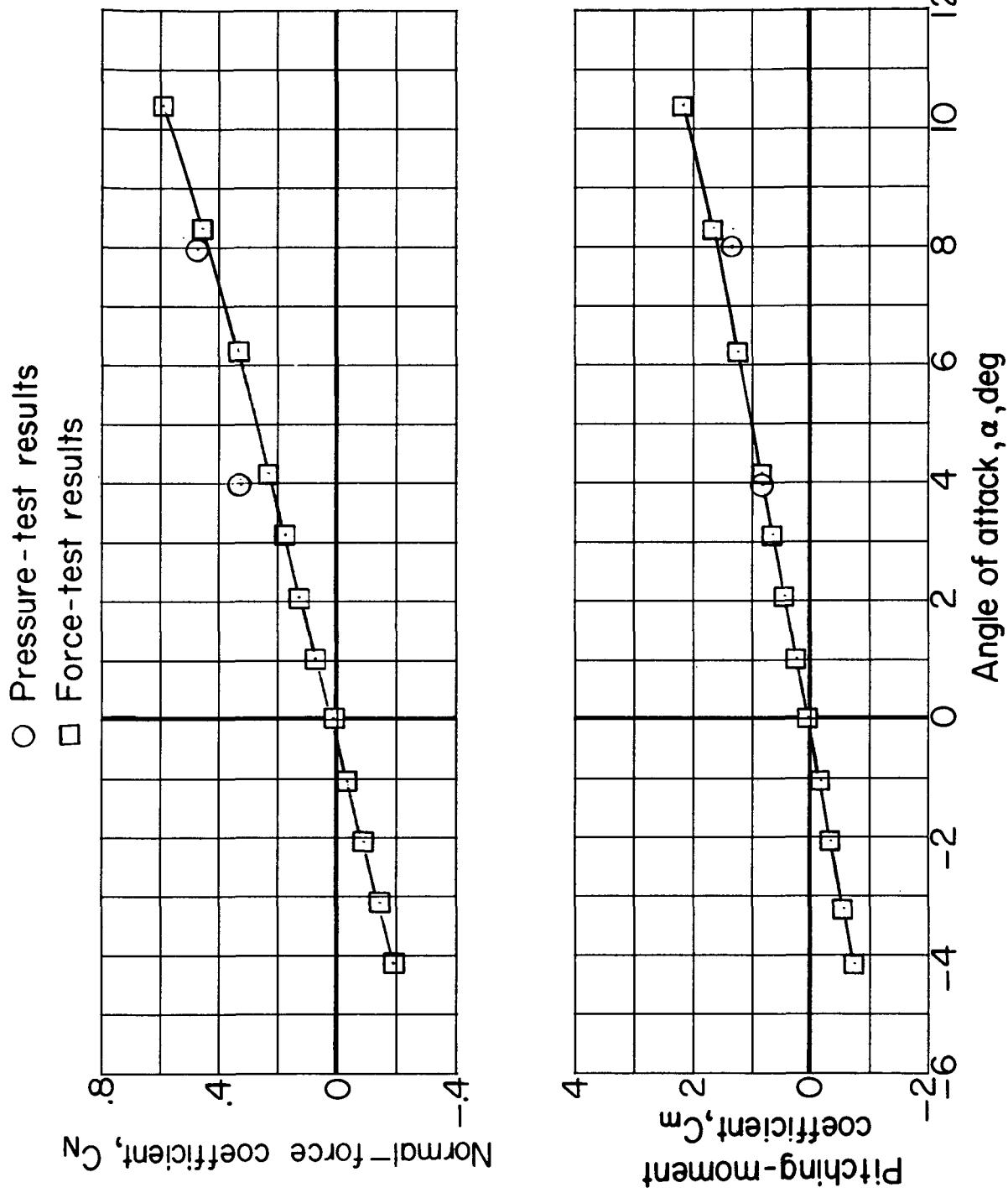
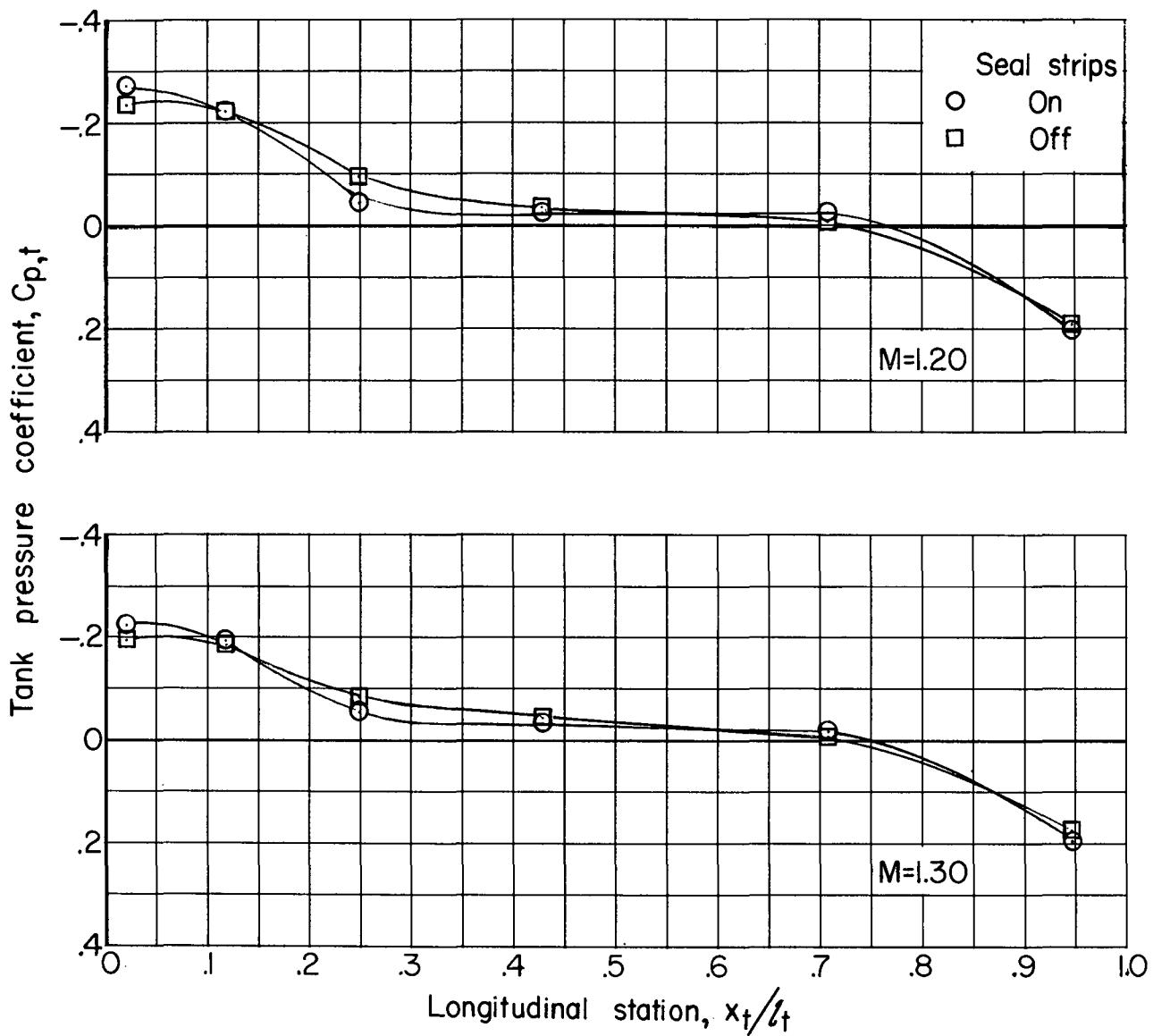
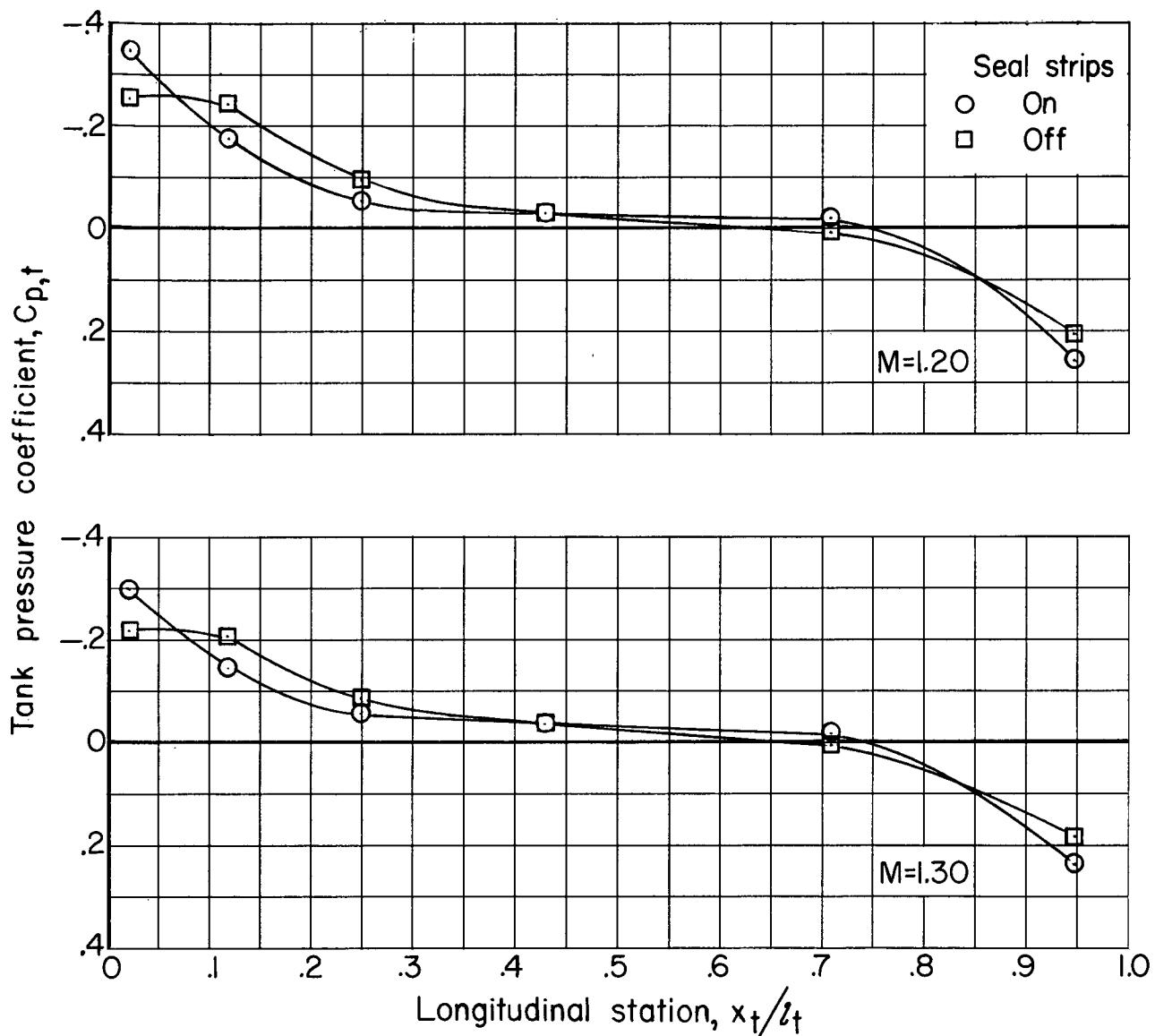


Figure 11.- Comparison of model normal-force and pitching-moment results obtained from pressure tests with those obtained from force tests. $M = 1.20$; seal strips on.



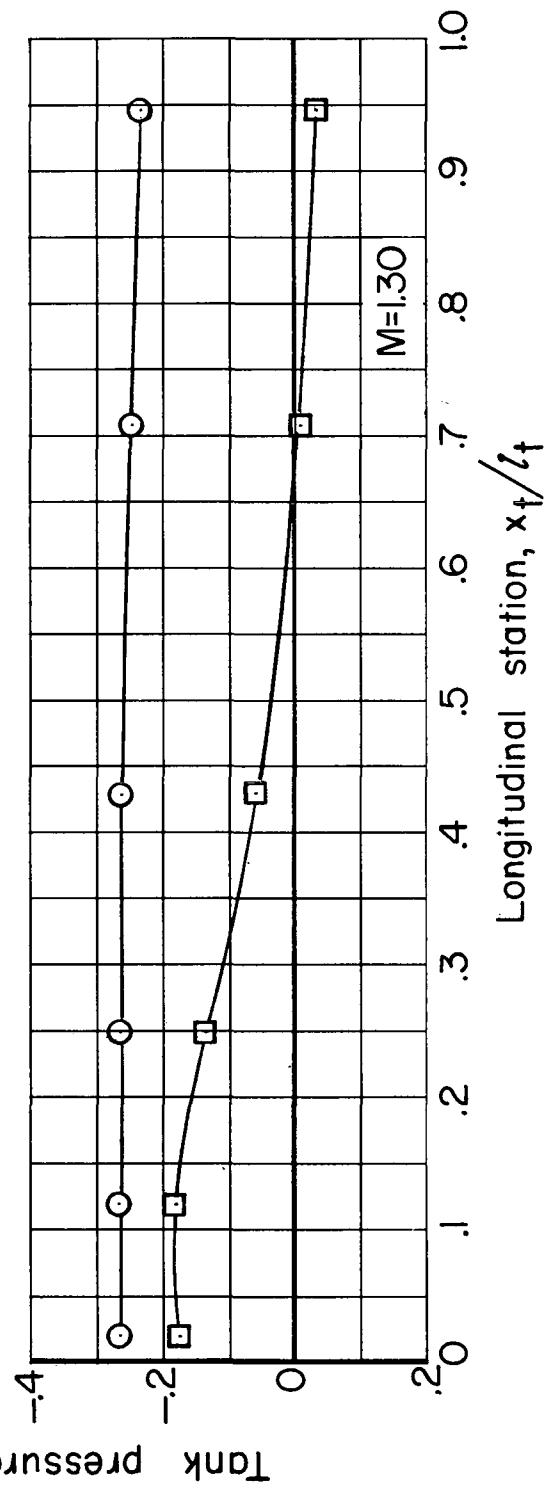
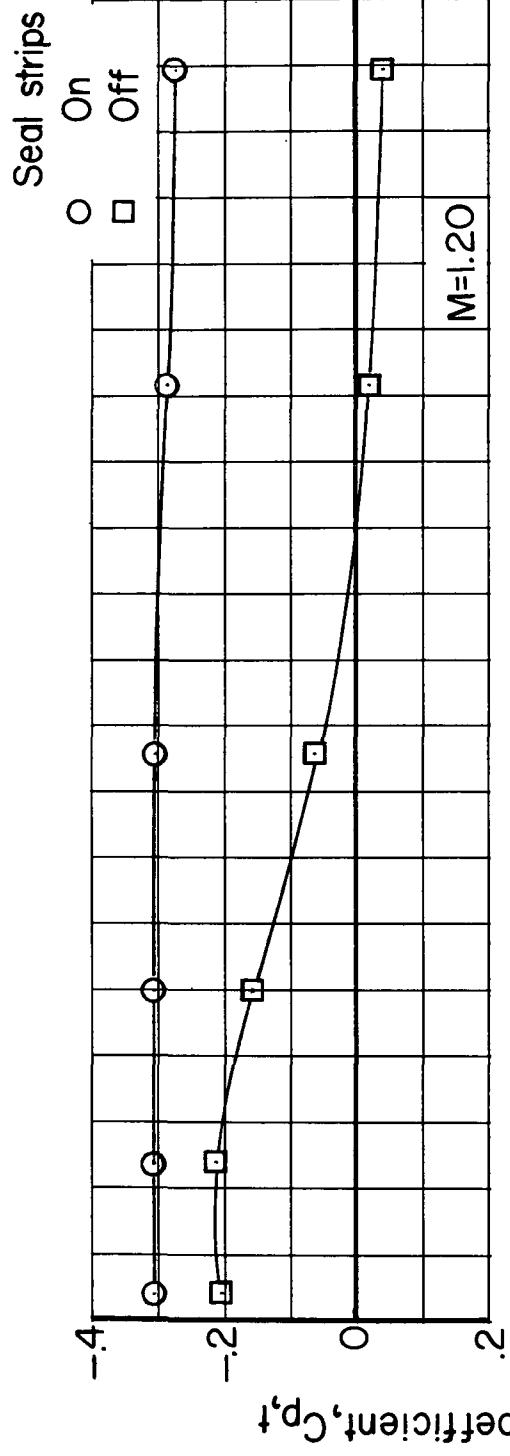
(a) $\theta = 0^\circ$.

Figure 12.- Pressure coefficients for model tank. $\alpha = 0^\circ$.



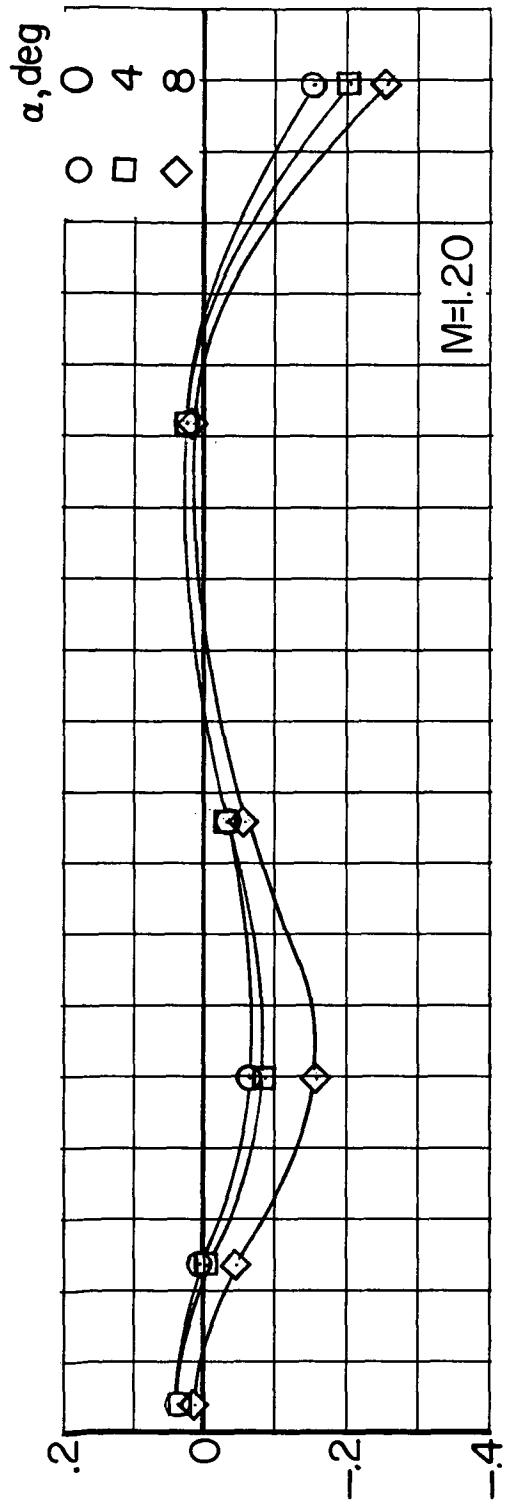
(b) $\theta = 90^\circ$.

Figure 12.- Continued.

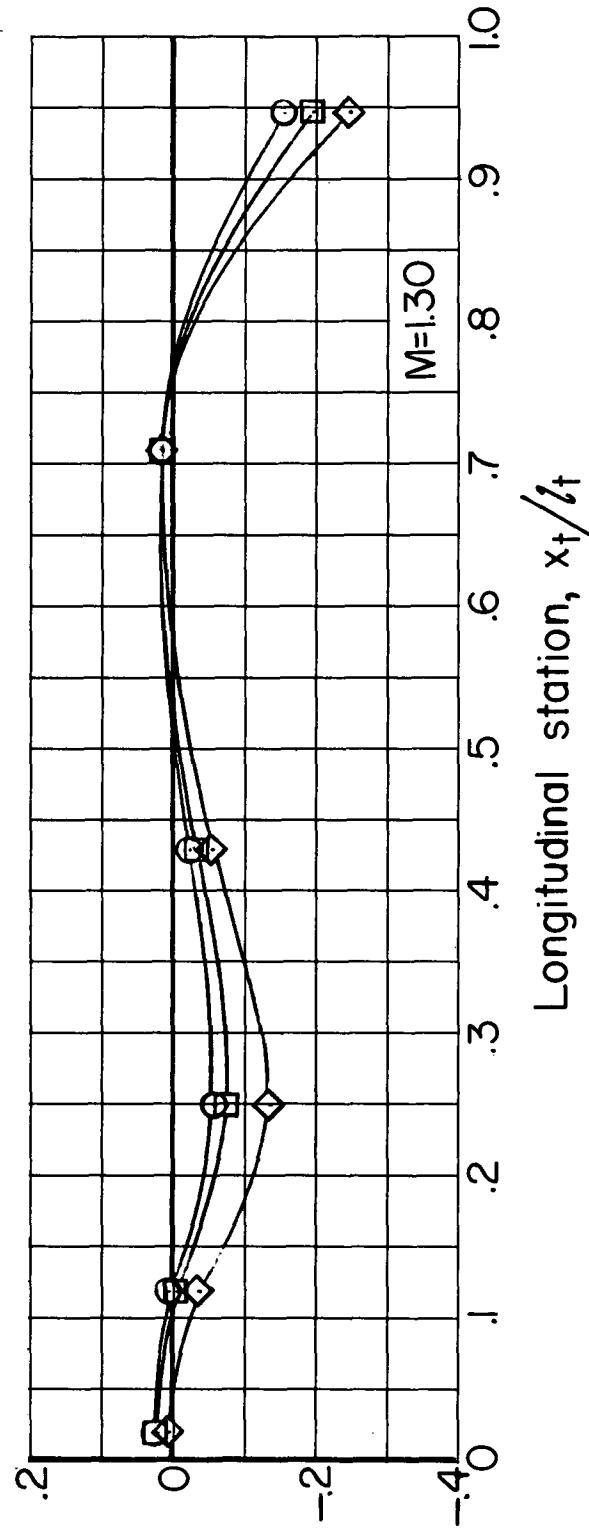


(c) $\theta = 180^\circ$.

Figure 12.- Concluded.

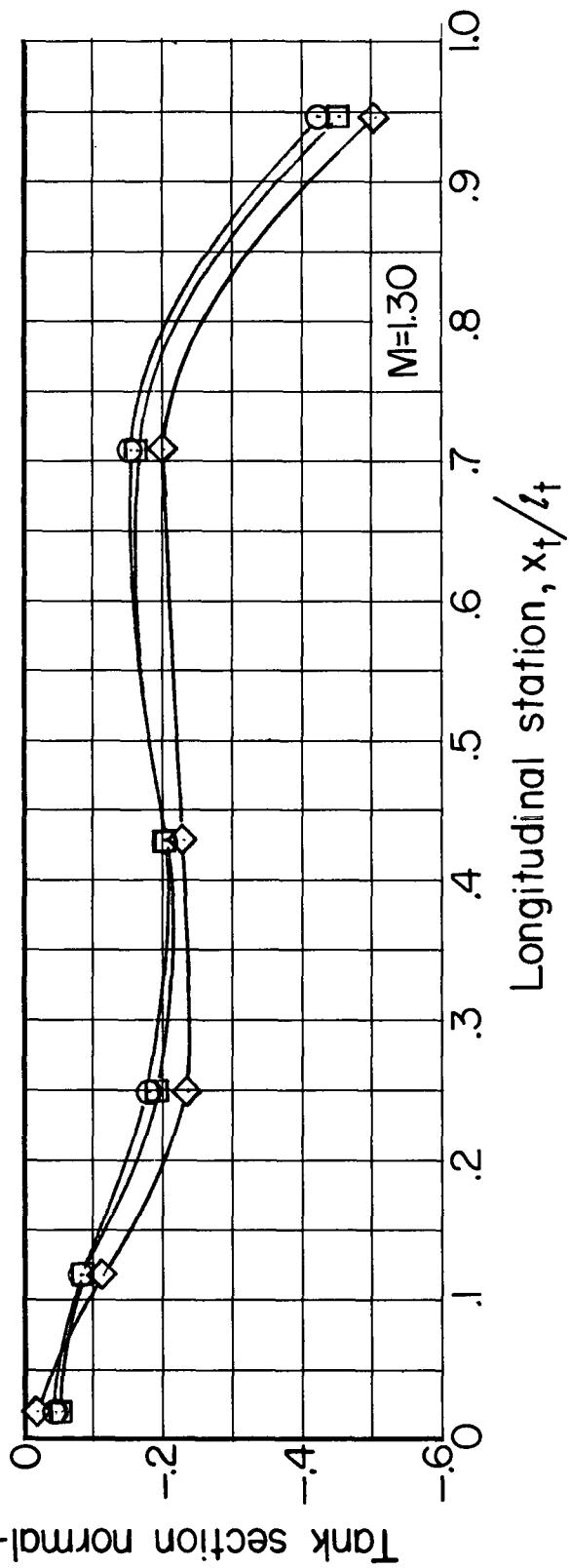
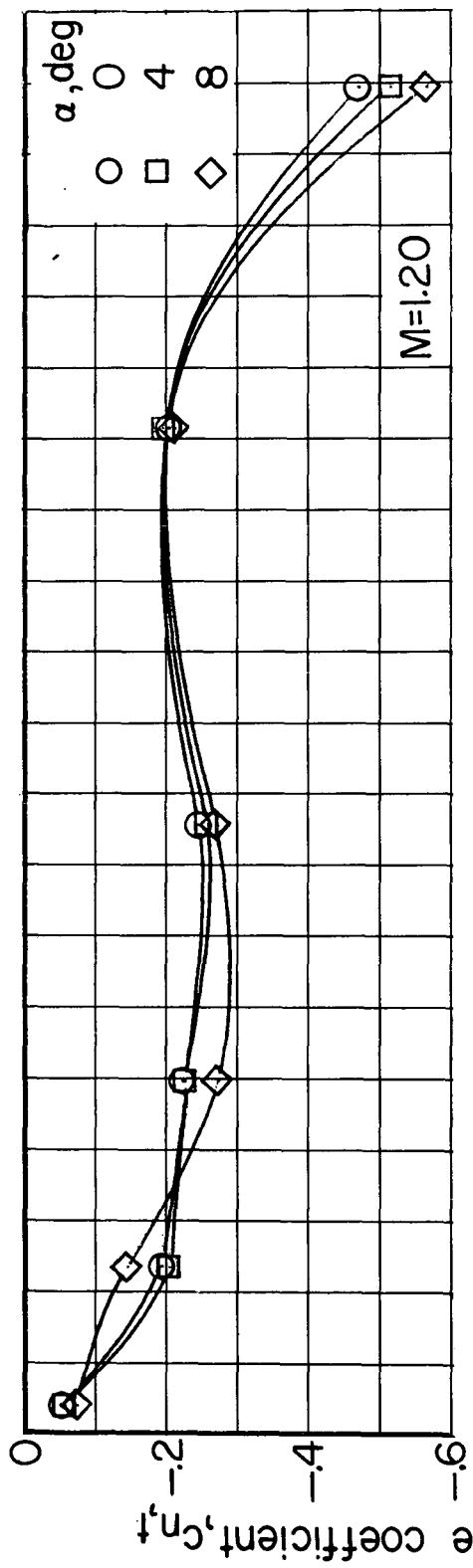


Tank section normal-force coefficient, C_{n_t}



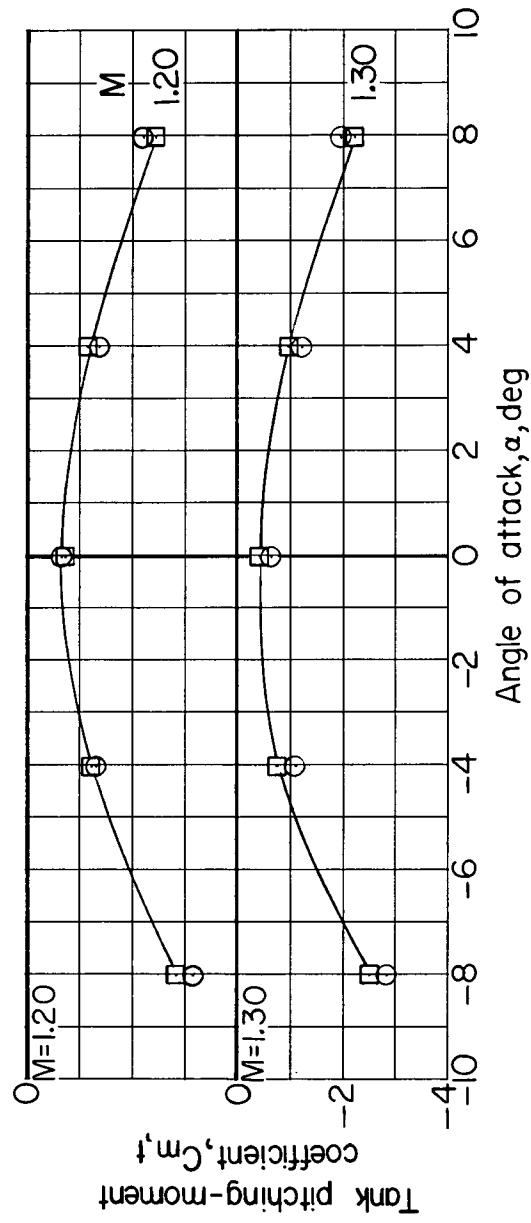
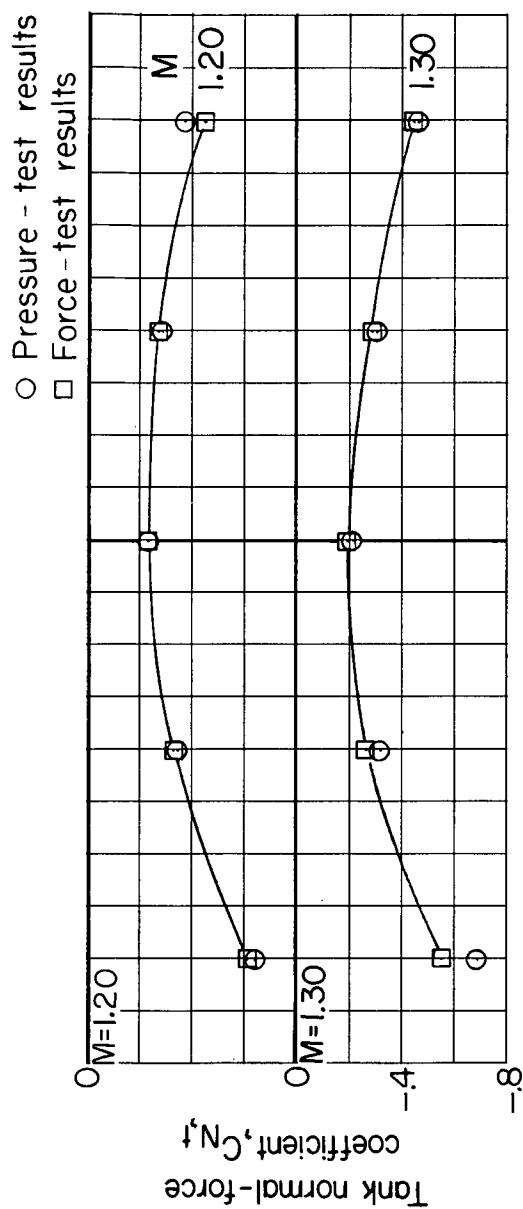
(a) Seal strips off.

Figure 13.- Section normal-force coefficients for model tank. $\phi = 0^\circ$.



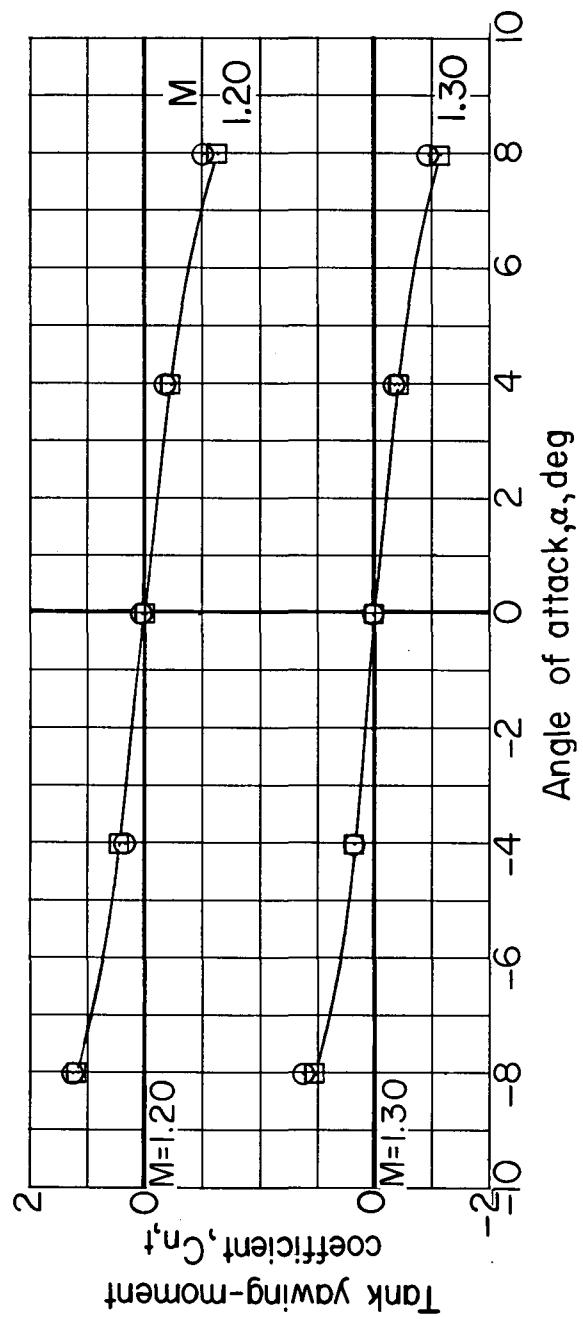
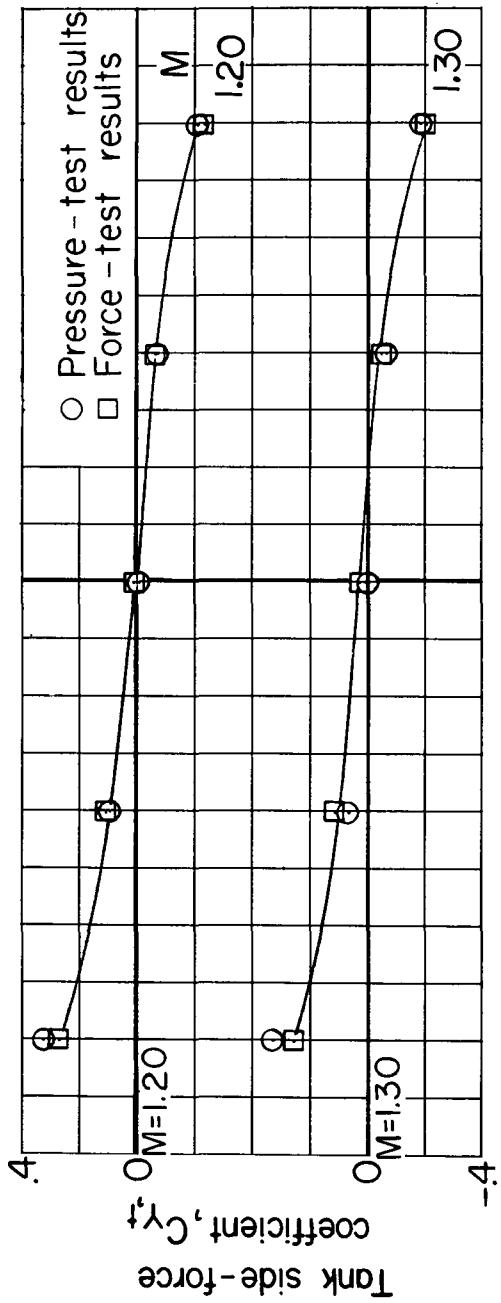
(b) Seal strips on.

Figure 13.- Concluded.



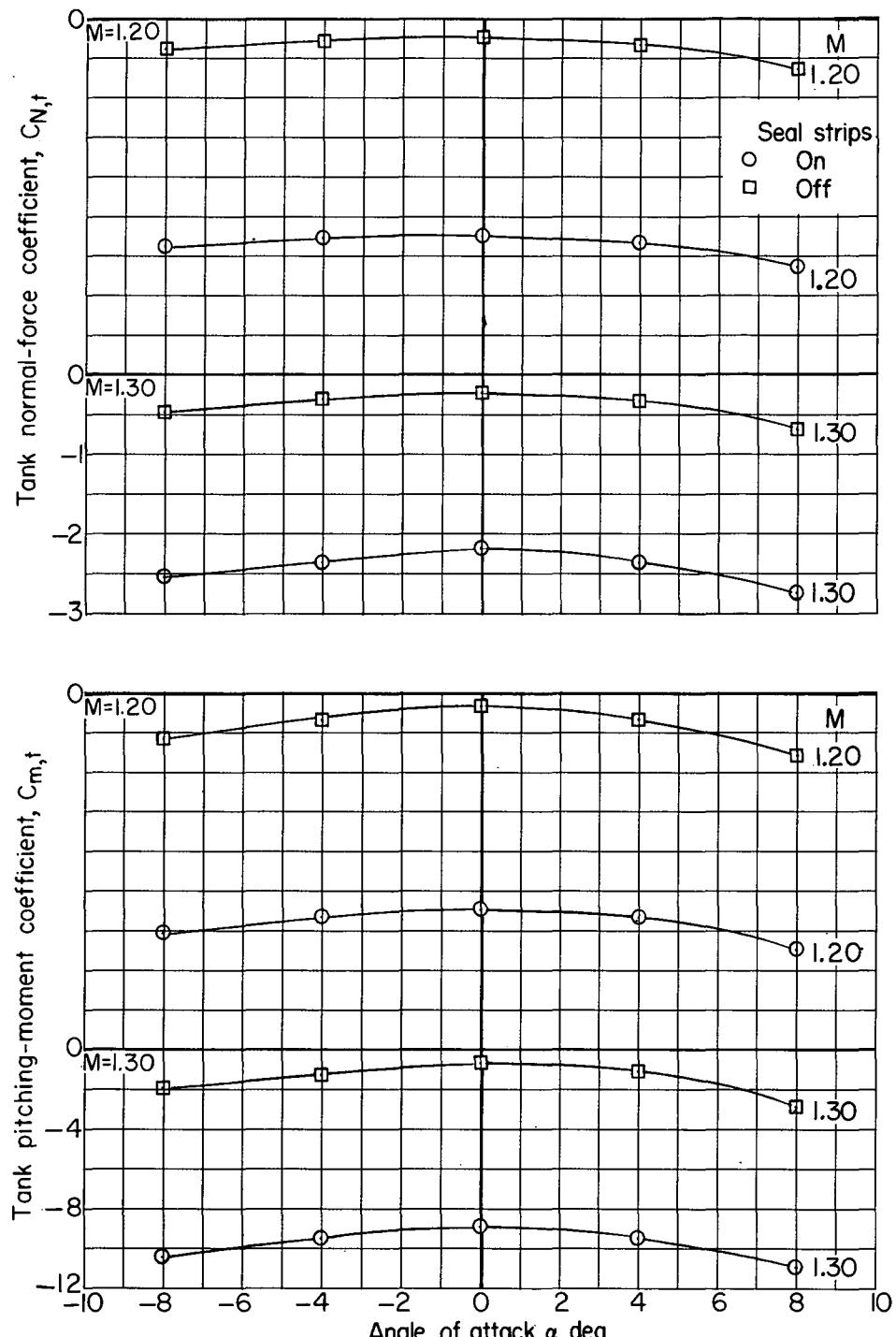
(a) $C_{N,t}$ and $C_{m,t}$ for $\phi = 0^\circ$.

Figure 14.- Comparison of model-tank static aerodynamic characteristics obtained from pressure tests with results from force tests. Seal strips off.



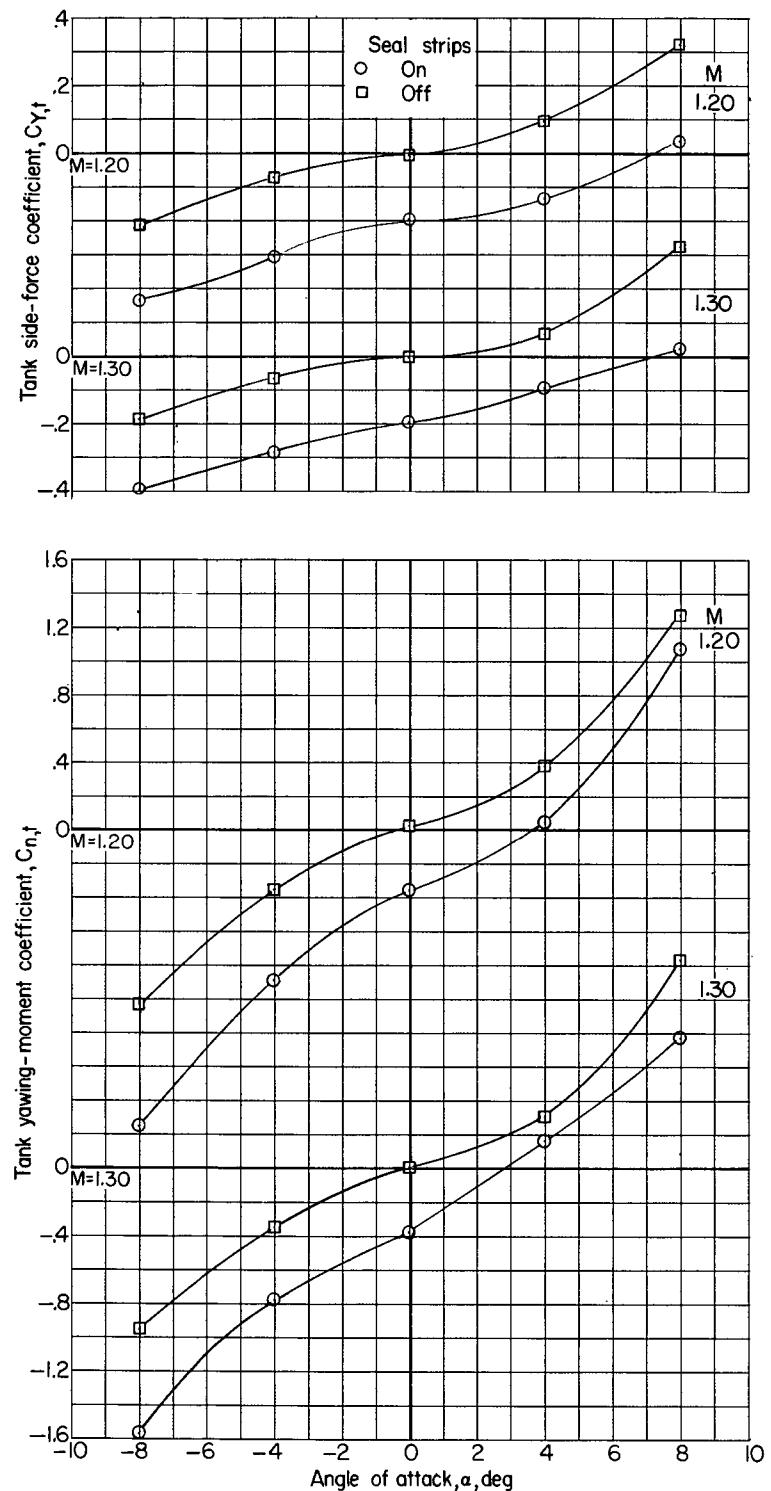
(b) C_Y, t and $C_{n,t}$ for $\phi = 90^\circ$.

Figure 14.- Concluded.



(a) $C_{N,t}$ and $C_{m,t}$ for $\phi = 0^\circ$.

Figure 15.- Effect of seal strips on model-tank static aerodynamic characteristics (results from pressure tests).



(b) $C_{Y,t}$ and $C_{n,t}$ for $\phi = 90^\circ$.

Figure 15.- Concluded.